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Pulverized Coal Distributing Systems*

Coal Powder and Its Characteristics—Storage and Feeding Devices—Pneumatic Transportation by the Suspension, Pressure and Emulsion Methods

BY JOSEPH F. SHADGEN

COALS in powder form have the physical aspect of a dark, floury mass, and the soft touch of an impalpable powder, unless the high ash content makes it feel gritty. Coal powders may be compared to wheat flour or ground cement, making naturally due allowance for the difference in color. Pulverized coal has all the specific characteristics of finely ground materials, of which the most interesting and important are density, angle of repose and explosibility.

Peculiarities of Pulverized Coal

The density of a fuel powder depends entirely on the relation of the volumes of air and solid matter within a given space. The laws of displacement of volumes always exist in connection with mixtures of solids and gases, and the relative lightness of the tiny carbon particles produces great differences. Scale tests record that 1 cu. ft. of coal powder usually weighs between 35 and 45 lb., which corresponds to a density of 0.56 to 0.72, as compared with 1.2, the average specific weight of solid coal. This indicates the large proportion of air gaps and the great porosity of the coal mass. Such a coal feels fluffy and can easily be penetrated with finger and hand. When stored for a long period the density increases because the air escapes slowly and the powder takes a firmer aspect and a harder form. Through the inevitable vibrations the mass sags down to a point where 1 cu. ft. contains 50 to 55 lb. of coal, equivalent to densities varying between 0.8 and 0.9.

The angle of repose is the natural angle of heaping granulated powders. For pulverized coals this angle varies between 25 deg. and 35 deg., according to the coal qualities. This information is relative because fine powders do not always follow strictly the laws of gravity of granulated materials. Impalpable powders often build up walls and form arches easily, which may readily collapse at the slightest shock or vibration, but which may also prove to be very recalcitrant to collapse. Everybody knows that fact and has wondered at the wheat flour in barrels of any store behaving in the same way. On the other hand, coal powder sometimes starts to flow and run, just like a fluid mass, at an angle much less than 25 deg.

These contradictory peculiarities of pulverized coal merit thorough investigation, on account of their influence on storage and feeding devices. Up to now very little attention has been given to the scientific study of these anomalies, known to all operators as their main troubles. The air included in the coal mass seems to be an important factor, and the reason may be surface reactions or local cohesive tensions. Humidity, too, is of great influence. Here is a promising field of research, because only exact knowledge of the relative importance of all factors, accidental and incidental, will bring out the final solution and definite remedy.

The Explosion Problem Analyzed

The danger of explosions always exists with any fuel easily mixable with air, and the conditions governing the explosibility of coal powders have not yet been submitted to a scientific analysis. The following definitions are given to dispel some apprehensions. An explosion is an instantaneous combustion of a fuel mass; that is, a combustion in a very short time, a fraction of a second, producing a large volume of gas at high temperature. If an explosion occurs in an open space these gases can expand freely without danger, but if an explosion occurs in a closed space the hampered expansion of the heated gases causes destruction and damage by tearing up pipe lines, smashing cyclone separators and buildings. An explosion can only happen if the combustible matter and air are mixed in the right proportions and if ignition occurs either through outside sources, such as a spark or a glowing soot particle, or through an inside source, usually termed self-ignition. It must not be forgotten that the above conditions have to co-exist to produce an explosion. The right mixture without a spark cannot give an explosion, and vice versa.

The whole problem of explosibility of powdered fuels is thus reduced to the determination of proportion of powdered coal-air mixtures and the study of self-ignition, in other words: Within what limits is a coal air mixture explosible? These limits will be specific to one certain coal of given volatile matter content, and will also be influenced by the fineness of grinding. The author has figures on this subject which he considers too unreliable for publication, as half information is misleading and creates more harm than good. Thorough investigation covering an important problem of this nature is not only very costly, but beyond the reach of individuals. National organizations, like the Bureau of Standards or the Bureau of Mines, are in position by reason of their equipment and resources to solve this important problem in a

*Copyright, 1920, by Joseph F. Shadgen. The author discussed "The Status of the Powdered Fuel Problem" in the issue of Jan. 1, and "Methods of Pulverizing Coal," issue of Feb. 5.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per lb.
Refined iron, base price	5.25c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 5.25c.
1 to 6 in. x ⅜ to 1 in.	3.52c. to 5.25c.
1 to 6 in. x ¼ to 5/16	3.62c. to 5.25c.
Rods—⅝ and 11/16	3.57c. to 5.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 6.50c.
Hoops	5.57c. to 6.50c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 5.25c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 5.25c.
3 in. x 3/16 in. and ⅛ in.	3.72c. to 5.60c.
1½ to 2½ in. x ⅛ in.	3.52c. to 5.90c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 5.85c.
1 to 1¼ in. x 3/16 in.	3.52c. to 5.90c.
1 to 1¼ x ⅛ in.	3.57c. to 5.95c.
⅞ x ⅞ x ⅛ in.	3.62c. to 6.00c.
¾ x ⅛ in.	3.67c. to 6.05c.
⅝ x ⅛ in.	4.07c. to 6.85c.
½ x 3/32 in.	5.17c. to 7.55c.
Tees:	
1 x ⅛ in.	3.87c. to 6.25c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 6.15c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 5.95c.
3 in. and larger	3.52c. to 5.30c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	5.00c. to 5.25c.
Toe calk, ½ x ⅜ in. and larger	6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 5.50c.

Sheets

Blue Annealed

	Per lb.
No. 10	6.62c. to 8.00c.
No. 12	6.67c. to 8.05c.
No. 14	6.72c. to 8.10c.
No. 16	7.82c. to 8.20c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	7.80c. to 9.90c.	
Nos. 22 and 24	7.85c. to 9.85c.	9.80c.
No. 26	7.90c. to 9.90c.	9.85c.
No. 28	8.00c. to 10.00c.	10.00c.
No. 30	8.10c. to 10.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	8.25c to 10.50c.
No. 16	8.50c. to 10.75c.
Nos. 18 and 20	8.65c. to 10.90c.
Nos. 22 and 24	8.80c. to 11.05c.
No. 26	8.95c. to 11.20c.
No. 27	9.10c. to 11.35c.
No. 28	9.25c. to 11.50c.
No. 30	9.75c. to 12.00c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.
⅛ in. Butt...	—36	—19
¼-3 in. Butt.	—40	—24
3½-6 in. Lap.	—35	—20
7-12 in. Lap..	—25	— 8

Wrought Iron	Blk.	Galv
¼-1½ in. Butt	—15	+ 5
2 in. Lap.....	— 7	+11
2½-6 in. Lap..	— 9	+ 7
7-12 in. Lap...	+ 2	+20

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per lb
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.50c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

Base Price	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	11.80	11.55
		90 lb...	11.90	11.65
		100 lb...	12.00	11.75
IC...$16.50	$14.25	IC...	12.25	12.00
IX... 18.75	16.25	IX...	13.25	13.00
IXX... 20.50	18.00	IXX...	14.25	14.00
IXXX... 22.25	19.75	IXXX...	15.25	15.00
IXXXX... 23.75	21.50	IXXXX...	16.25	16.00

Terne Plates

8-lb. Coating 14x20

100 lb.	$9.38
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	63c.
Bar	70c. to 80c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks	14½c. open 15c.

Lead and Solder*

American pig lead	10c. to 11c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c.
Commercial grade, per lb.	50c.

Antimony

Asiatic	11¼c. to 11¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c.

Old Metals

Prices are generally unchanged and demand is very slow. Dealers' buying prices are as follows:

	Cents Per lb.
Copper, heavy and crucible	16.50
Copper, heavy and wire	16.00
Copper, light and bottoms	14.25
Brass, heavy	10.50
Brass, light	7.75
Heavy machine composition	16.00
No. 1 yellow brass turnings	10.00
No. 1 red brass or composition turnings	12.50
Lead, heavy	7.00
Lead, tea	5.00
Zinc	5.25

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way that is beyond the bias of petty commercialism and for the common good of all concerned.

Storage and Feeding Devices

Pulverized coal is usually stored in an overhead bunker of suitable size to permit gravity discharge through hoppers and gates. These bins are mostly made of steel plates, duly reinforced. They should be of air-tight construction; all valleys of the hoppers should be steep and all inner surfaces smooth and rust-proof. Suitable poke holes should not be forgotten to control absolutely the material stored and to make eventual arches, or wall, collapse without too much effort. Hand holes often prove very convenient for the same reason.

Powdered coal feeders have to perform one of the most important functions in the practical utilization of these fuels, as their object is to control the flow of coal powder just like valves and gates check the volume of gases. A feeder has to deliver constantly a definite quantity of coal powder in a given time. Simplicity of construction is the greatest desideratum of feeding devices, with reliability and ease of regulation as close seconds.

Feeders for fine powders are mostly based on volume measures, not on weight control, and the following different physical principles are used in their practical construction.

Screw Type Feeders

Up to now the screw conveyor is the most popular powdered coal feeding device. Based on the principle that a helix turning around a shaft displaces the same volume at each revolution, it consists in substance of a screwlike flight mounted on a shaft rotating at very slow speed in a circular tight shell. The coal feeds on the top at one end and is delivered on the other end at the bottom. The whole device is of very simple construction, and to avoid the flooding of the coal powder referred to above, the lead of the screw is very small, and often double screw flights are used. The regulation of the output is obtained by gates or dampers set at variable openings, by the speed of rotation of the screw and by the diameter of the conveyor.

The great defects of screw type feeders are the unavoidable pulsations in the delivery of the powder. This intermittent delivery is inherent to the principle of the helix, as the circular shell can never be completely filled with impalpable material without choking. That this discontinuity is very undesirable is more than proven by the numerous patents which try to remedy this by ingenious combinations.

For a given conveyor the speed of revolving regulates best the output, and this should be in full control of the operator. Simple mechanical devices giving positive variable speeds are most desirable. Variable speed motors have been successfully used for driving individual screw feeders, but unfortunately their installation is limited to direct current because only in that form electricity permits simple construction and foolproof operation.

Disk Type Feeders

It may be opportune to draw the attention of both manufacturers and users of powdered coal to this type of feeder which is in successful operation in other industries, but has been completely neglected in this field. The feeder has a disk mounted on a vertical shaft rotating at slow speed, and one or more scrapers. The material delivered at the center of the disk spreads according to the natural angle of repose over the disk in a conelike heap. The scrapers usually formed by radially set knife blades plow a constant stream of material off the edge of the disk. The speed of rotation is very slow, and being uniform eliminates all complications of variable speed reductions. The delivery of the powder is absolutely constant without pulsations, and a large range of control can be easily attained by changing the setting of the knife blades or increasing their number. With proper precaution against the fickleness of flooding, disk feeders are apt to give service superior to any other feeders on account of their simplicity in construction and continuity, and uniformity of delivery. Their success in kindred industries has been totally overlooked by the specialists in pulverized coal, which show how narrow the channels of development of an industry are in this era of over-specialization.

Drum and Suction Types

Slow rotating drums or cylinders with radial compartments mounted on horizontal shafts turning at variable speeds are also extensively used for feeding devices, and their construction is most adaptable to special applications. For instance, where a back pressure is to be avoided or where a vacuum has to be maintained, drum feeders are the only devices giving tight joints. This type of feeder has a bad reputation for granular material, but it seems that with proper care in design satisfactory service for fine powders can be obtained in those special cases. The disadvantages of this type are the same as those of the screw conveyors, and nothing can change them, as they are inherent in the principle of the device.

Sometimes when high pressure air is used in the furnaces the coal powder is sucked out of the hopper by an ejector using the expansion of the air or the velocity of its flow as forces to deliver definite quantities of coal powder to the combustion chamber. Devices of this nature have been in successful use for years, but their economy may be doubtful and questioned, as the pressure of the air must exceed at least 25 lb. to assure constant and uniform delivery. For temporary installation suction feeders may be very expedient and simple, but for permanent operation they can hardly be recommended without close analysis of the specific conditions of operation.

Distribution of Fuel Powders

The concentration of crushing, drying and pulverization in large, efficient, well-balanced plants has created a new problem: The economic distribution of the coal powder to the furnaces. In cement plants this problem hardly existed, as the powdered coal installation was built in close proximity to the kilns. This problem developed in late years as the application of burning coal in powder form grew more varied, and the importance of this problem in the metallurgical field with its numerous forge fires, furnaces and ovens spread over whole plants cannot be underestimated. In fact, it is admited to-day by all interested that the distribution of the fuel powder is the heart of the industry, and this explains why progressive manufacturers devote considerable efforts to obtain greater simplicity and higher efficiencies with their transportation devices.

Economic distribution permits on the one hand the proper location of the pulverizing plant with due consideration to unloading conditions and safety independent of the furnaces, boilers, etc., and on the other hand economic distribution allows the proper layout of furnaces with due consideration to the manufacturing process alone without complicating side issues. Furthermore, economic distribution will give a chance to the small consumer of powdered fuels through operation of large pulverizing plants supplying a large number of small users. Just as gas plants and electric power stations bring to whole communities the advantages of gas and electricity because distribution of these utilities has been perfected to a high point of economy,

in the same way efficient distribution of pulverized fuels will give to a multitude of small consumers all the advantages of this method of burning fuels without the risks of large capital expense, and the inefficiency of a small plant based on compromise. Co-operation and enterprise solved this problem in the gas field, and in the electrical domain and, without being a prophet, it may be foreseen that the efficiencies of powdered fuel will develop along similar channels: Large centralized pulverizing plants in connection with an efficient distribution system.

The distribution system of pulverized fuel must be, first, safe in installation and in operation; second, cheap in installation; third, simple and economical in operation. The value of the devices described hereafter must be gaged with reference to these requirments, of which the first is all-important, as safety implies absence of explosions.

Distribution may use devices of mechanical nature or take advantage of air in the so-called pneumatic methods. Mechanical distribution uses the bucket elevator for vertical and the screw conveyor for horizontal transportation. These apparatus are known to everybody and fill enough space in all textbooks and numerous trade publications that not much time needs to be devoted to their description. Both elevators and screw conveyors, when used in conjunction with powdered fuel, have to be built airtight and dustproof to be safe and to comply with the health regulations. These mechanical devices, to say the least, are cumbersome with their multitude of parts, numerous bearings and heavy moving parts. Furthermore, for distances beyond some hundred yards their installation becomes costly and their operation very complicated and inefficient. All the pioneer pulverized coal installations made extensive use of the devices, in spite of their evident shortcomings, but to-day, in presence of more efficient methods, their installation may be considered obsolete.

Motor trucks, provided with hoppers and air-tight steel barrels, may also be considered as mechanical transportation devices, and give very economic service in some cases.

Pneumatic Distribution

Pneumatic transportation presents in its actual solutions great economies in the distribution of fuel powders and opens new possibilities to the extension of pulverized coal applications. Conveying by air is used extensively in Europe for a great variety of materials. Invented and first installed in England by Duckham in the eighties for unloading grain ships, so-called pneumatic elevators were developed in all European countries for granular material, such as wheat, corn, coal, malt, etc., and impalpable powders like flour, cement, lime, gypsum, salt, etc. This method of conveying seemed to have been neglected here in America in presence of the high development of mechanical transportation devices, but since 1916 several enterprising engineering concerns have brought out with great success pneumatic distribution systems of high efficiency and great economy.

The principle of using air as a conveying medium is most simple. By maintaining a vacuum or applying a pressure, high velocity air currents are produced in a system of pipe lines. By means of proper mixing devices, such as nozzles or tanks, the material is mixed with these currents and carried in a constant stream like a fluid until the equilibrium is destroyed or the impact used up by the constant friction against the walls of the pipe line. The installation consists either of an air compressor or a vacuum pump, a suitable mixing device, a piping system, and a separating unit with valves, cyclones and similar accessories.

The advantages of pneumatic conveying installations are numerous and most valuable for a labor-saving transportation system; their simplicity is a feature, as a reduced number of moving parts have to be lubricated; their flexibility is noteworthy, as they can be adapted to any building or space, and can cover long distances without trouble; their light weight and absence of heavy supports guarantee cheap installation cost, and their foolproof construction excludes the human element and provides permanent economic operation. Their only handicap up to now has been the low efficiency of the system reflected by a high power cost. This disadvantage is being improved by more scientific construction and new devices, and loses much of its weight in presence of the many advantages. Fuel in powdered form is particularly adapted for pneumatic conveying methods because of its uniform fineness, of its thorough dry state and of its relatively light specific weight, conditions which avoid the choking or plugging of the pipe lines and make for reliable and efficient operation.

The advantages and economies of pneumatic distribution have been fully appreciated by the manufacturers of pulverized coal equipment. A number of leading engineering concerns have developed several interesting practical solutions with various special objects in view, of which the following lines are an impartial and purely technical exposé.

Suspension System

The suspension method of distributing fine powder moves the solid particles suspended in an air current. To obtain this effect two things are required: First, the ratio of air to solid must be great, and second, the velocity of the air stream must be so high as to overcome the weight of the solid at any point of the circuit.

This system has been very popular in the last years, and consists essentially of a large pipe line 8 in. to 20 in. in diameter, varying with the amount of coal to be distributed, a high pressure fan producing the velocity of the circulating air, and a feeding device for the fuel. The coal-air mixture is tapped from the main line by valves into side pipes leading directly to the combustion chamber of the furnaces and a return pipe brings back the surplus coal to the main storage bin, thus avoiding all losses. The relation of coal to air can be made a constant, variable within limits by making the coal feeding devices dependent from the volume or the velocity of the air currents. The ratio of the mixture varies usually from 35 to 70 cu. ft. of air per lb. of coal; in other words, from ¼ to ½ of the air required for complete combustion of the coal, and the velocity of the currents usually oscillates between 5000 and 6000 ft. per min.

This system, correctly designed and properly installed, gives excellent service. It has the advantage of centralized control for a certain number of furnaces, and this quality makes it suitable, for instance, in forges with their numerous small fires, because no individual bins and separate feeders are necessary. The cost of installation is low and the upkeep reduced, as the fan rotor is the only wearing part.

The main defect of the system is the high power cost of the fan on account of the high velocities. Furthermore, the length of the circuit is physically limited. Beyond certain distances, to avoid dust deposits and the possibility of choking the pipe, relay stations with additional fans have to be installed. The coal air mixture is within the explosibility limits and, therefore, great care should be taken; absolute tightness of pipe line is essential, and proper precautions should prevent all possibilities of ignition.

The suspension system of distribution has its special field of application where its advantages outweigh its defects. Beyond this limit its installation may be ques-

tioned. A careful analysis of the local conditions should decide this question along the principles outlined.

Pressure and Emulsion Systems

The pressure method of transportation uses the static pressure of the air and not its dynamic impact as motive force. The coal is not mixed with air, but pushed through the pipe line by air pistons. The action can be compared to the mail tubes, where cylinders are shot through the conduits by a similar effect. The system consists of an airtight tank, provided with suitable valves for the introduction of the coal, with an inlet connection for the pressure air and an outlet connection for the delivery pipe, the transport line with the necessary switching valves and cyclone separators over the furnace bins.

The volume of air per pound of coal is very small, therefore small pipe areas are required, ¾ in. to 1½ in. for air line and 2 in. to 6 in. for delivery line. The diameter of the transport pipe governs largely the amount of coal shot through the system, while the pressure of the air limits the distance of distribution. Sharp bends and angles in the pipe line ought to be carefully avoided and airtight joints are absolutely necessary for reliable operation.

Distances up to 1500 yd. have been successfully covered with an air consumption varying between 1 and 4 cu. ft. per lb. of coal at pressures between 15 and 50 lb. per sq. in.; quantities like 3000 lb. have been rushed through a 4-in. pipe in about 1 min. at a distance of 500 ft. These figures are merely indicative; they have no other purpose than to reflect the economies and results obtained. Thermodynamic calculations show that the efficiency is very low and suggest that considerable improvements remain possible.

By providing two pressure tanks and operating them alternately in conjunction with scales preferably of the recording type, the pressure system gives a constant delivery with easy checking and control at each furnace. The cost of installation of the system is low, but individual bins and feeders at each furnace are required, which have to be taken into account in comparisons. The amount of air is small, but its high pressure necessitates an air compressor. Explosions are excluded, as the air and coal are not mixed.

The pressure system is recommendable for distribution over long distances to large furnaces. Outside of that field knowledge of the exact local conditions is necessary to give correct advice.

The emulsion system is the latest application of pneumatic distribution just developed beyond the experimental stage. It is based on the principle that air produces an emulsion with pulverized coal; in other words, a small amount of air, thoroughly mixed with an impalpable powder, produces a heavy fluid mass that flows and throws waves like water, that can be stirred by a stick like a fluid, that feels fluffy and light. It seems that each particle of coal is surrounded by a tiny air volume which reduces the friction of the solid matter and counteracts the viscosity of surface tension. This fact has been known for oils and liquids, and is utilized commercially in several interesting applications, but for pulverized solids it had been overlooked until lately. The remarkable qualities of emulsive mixtures open new possibilities to the pneumatic transportation methods, as powder coal emulsions flow like heavy oil and can be pumped like a fluid.

In its actual patented form the emulsion transport consists of a hopper feeding by gravity, a screw conveyor provided with a helix of variable pitch, rotating at high speed in a circular shell. The coal is compressed in this conveyor and delivered to the nozzle, where a certain number of air jets produce the emulsive mixture which starts to flow through the pipe line, pushed by the constant pressure of the screw. An adequate system of gates and switch valves gives to the system flexibility and adaptability. No cyclone separators are necessary, because the amount of air is too small for their action, less than 1/3 cu. ft. of air being required per pound of coal to emulsify pulverized fuel. The air pressure depends on the nature of the coal and the length of the transportation, and varies from 15 lb. to 50 lb. per sq. in. The diameter of the screw and the diameter of the pipe govern the capacity of each system, which changes with the length of transportation. The power consumption per ton of coal distributed is very small. As built to-day, the emulsion system is not purely pneumatic, the pressure of the screw conveyor being a mechanical force causing the flow of the mass. The efficiencies obtained to-day are high and with further study and research can doubtless be greatly improved.

The emulsion distribution system is too new to permit critical comparisons and to assign to a special field. The cost of distribution is very difficult to express in dollars and cents, and it is very hard to give reliable figures on that subject. Local conditions vary and influence this item so much that generalities are misleading. In all fairness it must be said that the pneumatic distribution systems have progressed considerably, and in their present form are far superior to the mechanical devices. When it comes to the choice between systems it will be well to remember that no absolute superiority exists and that local conditions alone will decide on the most practical solution. Combinations of the various systems described above may be profitable and economical.

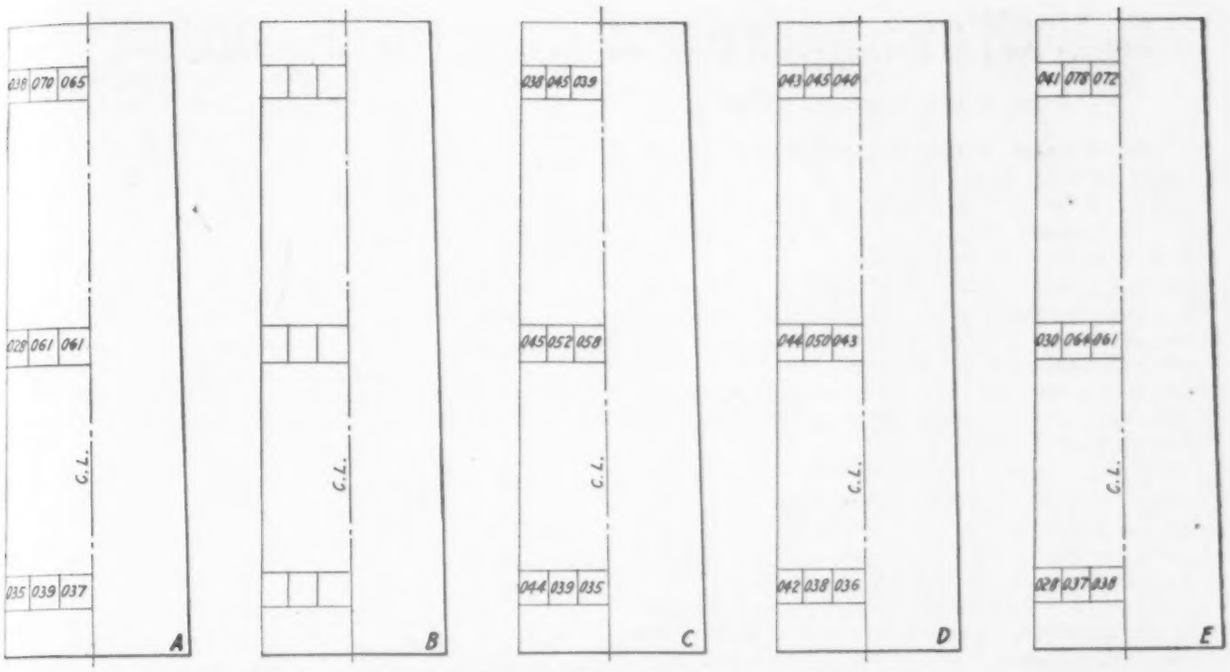
Aluminum Additions and Sulphur Segregation

Effect of Various Additions to Low Carbon Steels—Proper Method of Adding the Metal

BY MARK C. SMITH

THE value of intelligence on the pouring platform is often overlooked by the steel maker and in many cases the teeming of the steel is left without supervision of any sort to the discretion of the steel-pourer, who is often unfit to use such discretion and who is prone to handle the situation with the least physical effort to himself and without regard to the value of the steel. This is particularly true when it comes to adding aluminum to low carbon steels. The following tests were made with the intent to ascertain the proper amount of aluminum requisite to prevent sulphur segregation. The carbon content of the steel was 0.15 per cent.

In the first test aluminum was carefully weighed and placed in paper bags; 2 oz., 4 oz,, 6 oz. and 10 oz. to the ton of steel respectively was used. After several ingots had been poured to insure a good stopper, this aluminum was added just before the steel was up to the required mark. Ingot A, to which two ounces were added, grew in the mold several inches; ingot B, to which four ounces were added grew so rapidly that additional aluminum



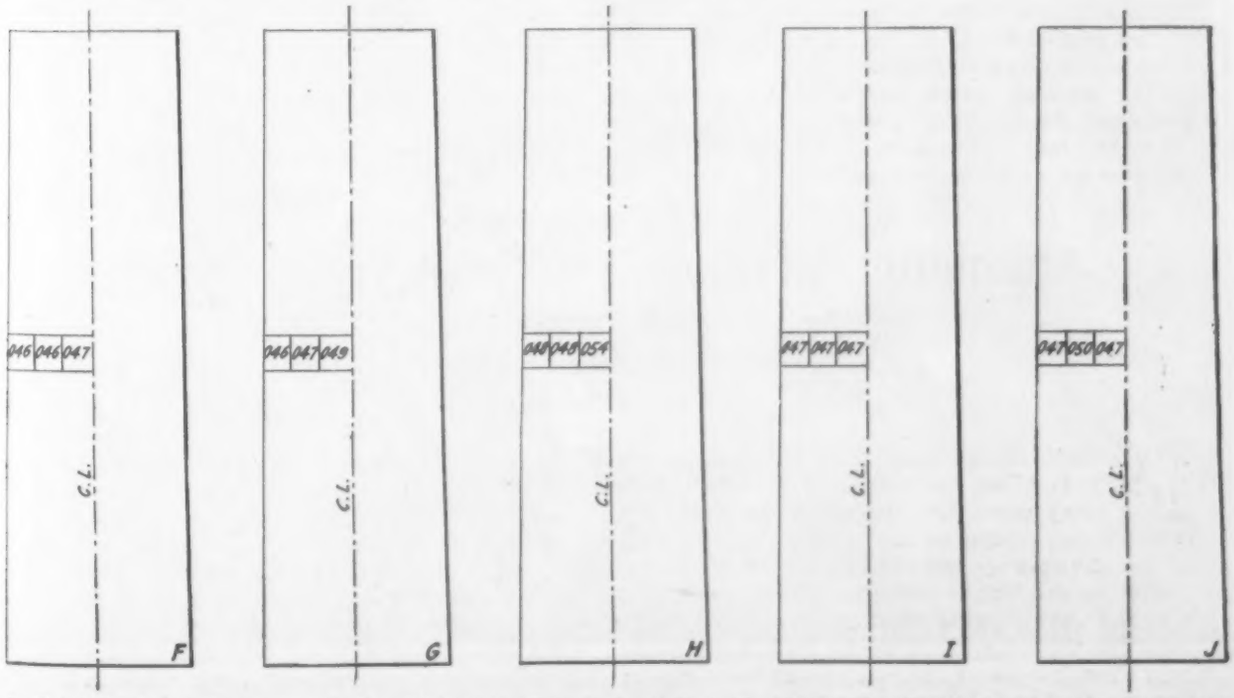
In Ingot A There Was Introduced 2 Oz. of Aluminum; in Ingot B, 4 Oz.; in Ingot C, 6 Oz.; in Ingot D, 10 Oz., and in Ingot E, No Aluminum. The ladle test showed 0.045 per cent sulphur.

was added to keep it from overflowing the mold; ingot C, to which six ounces were added, grew but slightly and ingot D, to which 10 ounces were added did not grow at all. The growth of the ingots to which no aluminum was added was several inches or about the same as ingot A.

These ingots and the one following them without aluminum were followed through the mill and test pieces were taken in the 4 x 4 in. billet at the top of the ingot immediately after the discard, from the middle of the ingot and from the bottom just before the final crop. For analysis a hole 2¼ in. deep was drilled and the drilling kept separate for each ¾ in., thus representing the corresponding parts of the ingot itself, as is shown in the illustration. The usual ladle test taken after the eighth ingot showed 0.045 per cent sulphur and the result of the analysis of the drillings is shown in Fig. 1. It will be seen at a glance that ingot D, to which 10 ounces of aluminum to the ton of steel was added, shows the best results and also that the salient figures are those of the tests taken from the middle of the ingot.

The next test was conducted in much the same manner, except that the adding of the aluminum was varied slightly in that with some of the ingots it was fed into the stream a little at a time all the way up the ingot. Test pieces were taken from the middle of the ingot only and were drilled as before. The ladle test showed 0.046 per cent sulphur and the result of the analysis of the drillings is shown in Fig. 2.

Here again we see that it is the ingot to which the 10 oz. of aluminum per ton of steel was added that shows the best results. This value shows too, that the better way of adding the aluminum is gradually during the pouring rather than in a lump at the top.



In Ingot E, 6 Oz. of Aluminum Was Added at the Top; in Ingot G, 8 Oz. All the Way Up; in Ingot H, 8 Oz. Added at the Top; in Ingot I, 10 Oz. All the Way Up, and in Ingot J, 10 Oz. Added at the Top. The ladle test showed 0.046 per cent sulphur.

High Intensity Factory Illumination

Economic and Social Effects—Specifications for Artificial Sources of Light—Range of Intensities for Various Kinds of Work

BY M. A. SMILARI*

As a concrete expression of the increasing conviction that factory operation is most successful when work is done under broad daylight conditions properly controlled to secure suitable diffusion, progressive manufacturers have generally adopted, in the erection of new buildings, the modern type of industrial structure with windows and skylights of such generous proportions as to suggest the glass house or the conservatory. Photometric measurements show that in our daily life with daylight conditions we habitually work under light intensities running into the hundreds of foot-candles with perfect ease. We do not feel the slightest trace of discomfort in performing our tasks under this high and diffused natural illumination. It is worth while noting that the industrial processes requiring low intensities or the exclusion of light are very few indeed.

Having once experienced the advantage of broad daylight, it is natural to aspire for an artificial illumination of high intensity so as to approach daylight standard when natural light fails us at night, during cloudy weather or in the winter season. This idea is being crystallized in the minds of managers, workmen's unions, legislators and the public in general. Compliance with these new requirements, however, has made but laggard progress. Nevertheless, the standard of artificial illumination has been constantly rising in the last few years.

The former objections to progress in this direction centered about the lack of suitable and efficient lighting sources, and the high cost of lamps, fixtures, installation, maintenance and operation as compared with the advantages derived. But, with the recent development in the art of illumination, resulting in the introduction of efficient equipment of low cost, the restraining causes working against the general adoption of high intensities have been removed.

High Intensity Specifications

An effective industrial artificial lighting scheme of high intensity should make use of sources of light answering the following specifications:

1.—It should be of high efficiency which, with the universally used Mazda lamps, involves large units having filaments of high intrinsic brilliancy.

2.—It should have diffusing properties to be free from glare and from the possibilities of causing glaring reflections. The brilliant filament should never be tolerated within the field of vision.

3.—It should be small enough to insure uniformity of illumination and at the same time it should give sufficient

*Edison Lamp Works, Harrison, N. J.

A Factory Where Local Lighting Is the Rule. The general effect is gloomy, cheerless and depressing. The harsh contrast between the bright spots immediately under the local lamps and the surrounding dark areas is very fatiguing to the eye. The illumination is not sufficient all over the working bench, decreasing speed and efficiency of worker, and the aisles are dark, inviting accidents

The Factory With Up-to-Date General Illumination. The pleasing uniform illumination suggests daylight with all its cheerful and stimulating effect on the workers. All aisles and corners are illuminated for comfort and safety

direction to bring out the necessary shades and shadows of three dimensional objects. Violent contrast of light and dark surfaces in close proximity should be avoided and only soft shadows be obtained.

4.—It should give such distribution as to secure the desired amount of vertical illumination.

To fulfill all of these requirements, mutually conflicting as some of them are, it is a practical necessity to resort to compromise.

A standardized direct unit which is suitable for most factory lighting is shown in one of the accompanying illustrations. It is a light source of high efficiency and diffusing properties. The enameled steel dome reflector is known as the Reflector and Lamp Manufacturer's Standard (abbreviated RLM Standard). It is manufactured upon specifications based upon extensive investigations and study covering metal reflectors of the dome type for general illumination and represents the combined effort of the leading manufacturers of metal reflectors and the illuminating engineers of the Mazda lamp manufacturers. The specifications provide:

1.—A durable and highly efficient reflecting surface.

2.—A contour of reflector which will insure an effective light distribution.

3.—A diameter and depth of each size of reflector, which will produce adequate diffusion of light and a sufficient screening of the source to minimize glare.

The RLM Standard reflector used in conjunction with the bowl-enameled gas-filled Mazda lamp secures a high intensity unit, which can be viewed with the naked eye without discomfort. The use of the bowl-enameled lamp means the sacrifice of only from 10 per cent to 12 per cent of the output of a corresponding unit with a clear lamp. But, as it remarkably reduces the sensation of glare, the loss is changed into an actual gain in seeing ability. The diffusion obtained by the bowl-enameled lamp is superior to that of the frosted lamp, whereas a 100-watt frosted lamp has a maximum brightness of about 75 candlepower per sq. in., the bowl enameled lamp of the same size has a brightness of only 10 to 12 candlepower per sq. in.

It is interesting to note that the white enamel used is mechanically and chemically resistant, as it does not chip, crack or discolor and is not affected by exposure to acid fumes.

Advantages of High Intensity Illumination

Reliable data on the relation of high intensity illumination to industrial activity has been collected by various managers and engineers. It bears out emphatically the economic and social justification of high intensity illumination in the modern factory, office, mill, shipyard or mine.

Even a casual study of the factors entering into efficient production and plant operation will reveal that success depends on two main lines of effort:

1.—The intensive utilization of the equipment at hand.

2.—The increase of the efficiency of the personnel, and its continuous maintenance at a high level.

The first group concerns itself with the physical plant. The second with a variable human element demanding a consideration of all the complex human traits involved.

High intensity illumination is a necessary condition for the attainment of these two fundamental industrial aims. Conclusive tests, often published in our technical press, prove that the adoption of high intensity lighting brings about a decided increase in the output of a plant with total lighting costs amounting to only a small fraction of the entire labor costs.

Figures show that in machine shop operation with no other change but the adoption of high intensity illumination, 10 per cent to 15 per cent increase in production has been obtained with a lighting cost of

1 per cent to 5 per cent of the total amount of payroll.

The specific advantages of high intensity illumination contributing to this end are as follows:

1.—The personal efficiency of the employee is improved. While insufficient lighting strains the eye, reduces its visual efficiency, and has a tiring effect upon the mind and body, adequate lighting of the high intensity standard not only conserves the eyesight, but improves perception of detail. This saves the man's time and increases his output.

2.—Overhead expenses are reduced by permitting multiple shift operation. The night shift has the same lighting advantages as the day shift.

3.—Order and neatness about the plant is promoted. There are no semi-dark corners or aisles for the accumulation of dirt and material. Incidentally the fire hazard is reduced and the likelihood of better utilization of the floor space increased.

4.—Spoilage of work and the tendency to loaf is cut down, because favorable lighting conditions tend to arouse the individual to greater alertness and keenness. That poor lighting is conducive to errors, mistakes, slow work and low efficiency is brought out forcibly by a recent United States census report. Spoilage for American factories totaled $150,000,000 a year, $28,125,000 of this being traced to poor artificial lighting.

5.—The facility for constant inspection of work tends to improve the quality of the product, and to develop pride in good workmanship.

6.—General good health is promoted. The eyesight is protected and conserved. The improved environment is conducive to greater pride in personal neatness and it cannot fail to exert its influence upon the home. This welfare viewpoint can no longer be neglected with impunity.

7.—Accidents are reduced considerably. Low intensity and glare are directly responsible for eye strain, general fatigue, missteps and false movements that often enough spell accident, with all its damaging and demoralizing effects. An investigation made by insurance men a few years ago shows that, out of 91,000 accidents in factories, 23.8 per cent could be traced directly to poor illumination. Of 2100 fatal accidents, it was discovered that fewest occurred in the months of most daylight and the largest number in the months of least daylight.

8.—Employees are less prone to leave their work. Labor turnover is reduced together with employment bureau and training expenses.

9.—The stimulating effect of a bright and cheerful workroom dispels depression and gloom, thus promoting contentment among employees. In conjunction with the enjoyment of other good sanitary conditions and humane treatment, they become soon convinced that the employer is their friend, that he believes in their dignity as men, in safeguarding their health and their life, and that he is promoting their general welfare. The resulting tendency will be to develop loyalty to their employer and reduce the opportunity for labor disputes.

In this critical period of transition in the readjustments of social and economic life, with the increasing scarcity of labor, it would be superfluous to dwell on the necessity of satisfying the two crying demands of the entire social unit—the employer, the employee and the general public—for a maximum of production, and for the further improvements in working conditions.

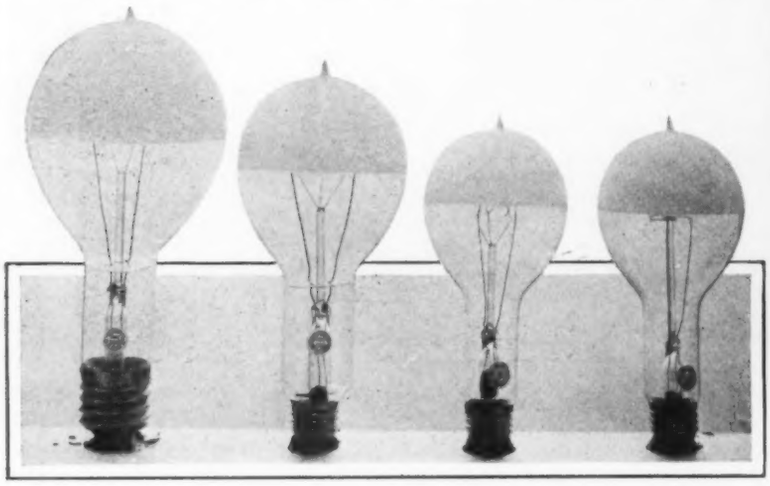
There is a financial and a human profit in the adoption of high intensity illumination in the factory, the shop, the mill, the mine, the shipyard, the office and workroom in general. In view of its low cost as compared with poor lighting, hesitation to adopt it is inexcusable. Its stimulating effect upon production and its influence upon the relation of employer to employee is fraught with the widest possibilities for service to industry and humanity.

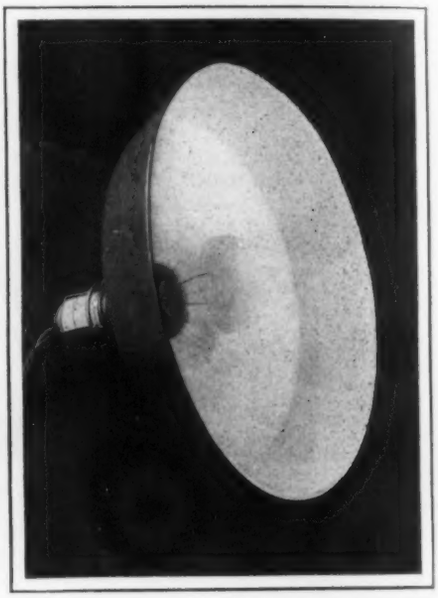
Range of Illumination Intensities

The accompanying table gives the range of intensities for various kinds of work, as they should be to satisfy the modern standard.

Bowl Enameled Mazda "C" Lamps for Direct Lighting. They reduce glare and increase seeing ability

The illustration at the right is the standardized direct lighting unit. This is the RLM standard reflector used with the Edison bowl enameled Mazda "C" lamp. It gives a high intensity unit with good diffusing properties





Range of Illumination Intensities

	Foot Candles		
	Minimum	Average	Productive
1.—Roadways and yard thoroughfares	0.02	0.25-0.5	...
2.—Storage spaces, stairs, stairways, halls, hallways, passageways, aisles, exits and elevator entrances	0.25	1-2	...
3.—Water closet compartments, toilet rooms, washrooms, dressing rooms and elevator cars	0.50	1.5-5	...
4.—Work not requiring discrimination of detail such as handling material of a coarse nature and performing operations not requiring close visual application	0.50	2	4-6
5.—Rough manufacturing requiring discrimination of detail, such as rough machining, rough assembling, rough bench work, also work in basements of mercantile establishments requiring discrimination in detail	1.00	3	6-10
6.—Rough manufacturing requiring closer discrimination of detail, such as machining, assembly and bench work, also work in basements of mercantile establishments requiring closer discrimination of detail, intermediate between 5 and 7	2.00	5	10-15
7.—Fine manufacturing, such as fine lathe work, pattern and tool making, also office work, such as accounting and typewriting	3.00	8	16-20
8.—Special cases of fine work such as watch-making, engraving and drafting	5.00	8	18-30

Foot-Candle Meter. With this instrument the illumination can be read directly and quickly

The foot candle meter shown in the illustration above is a simple and inexpensive instrument of approximately the size of a folding camera. It can be used by anyone, without complicated adjustments or calculations, in quickly and directly reading the intensity of the illumination under which he is working. A comparison with the value given in the table for the particular occupation will point out where there is room for improvement.

The first column gives the minimum foot-candle intensity required by the industrial code of the State of New York. The second column gives values for average lighting. The third column gives the productive intensity values.

Heavy Business with England and Japan in March

WASHINGTON, May 18.—England led in receipts of March exports of metal working machinery from the United States. Out of a total of $5,180,175 of these exportations, England received $1,152,963. The share of France was $1,057,542. Canada was third with $558,721, and Japan fourth with $497,652.

Japan was the chief purchaser of tin and terne plate and taggers tin during the same month. The total exportation of that commodity from the United States for March, 1920, was 48,156,198 lb., valued at $3,531,182. More than half of this went to Japan—16,319,328 lb. with a valuation of $1,219,362; Canada received 14,837,873 lb., worth $1,062,369.

On the import side, the figures of the Department of Commerce show that the United States imported 11,980,019 lb. of tin bars, blocks and pigs in March, 1920, at a value of $6,781,287. Of this, 9,490,145 lb., worth $5,392,701 came from the Straits Settlements, and 1,764,604 lb. with a valuation of $1,004,449 came from England.

The Spanish Iron Industry

WASHINGTON, May 18.—Unless protective duties sufficient to encourage development of the iron and steel industry in Spain are provided, the future of the industry there is not bright, according to an elaborate report on the Spanish iron and steel industry by American Commercial Attache Chester Lloyd Jones, at Madrid. Mr. Jones describes the effect of the war in curtailing both the production and export of iron ore in Spain, and outlines the situation with reference to the outlook for the future. There is agitation in Spain at the present time for a tariff provision which will provide protection for the industry, but at the possible expense of a limitation of imports.

In reviewing the situation Mr. Jones says:

"The uneasiness about the future is not to be taken to indicate, however, that Spanish iron and steel plants are at the present time operating under unfavorable circumstances. With the realization that the fact that the war has terminated will not bring a cutting down of the demand for iron and steel goods and that the greater industrial countries are having even more than they can do to keep up with local demands and repair the damages of war, has come the conviction that for the immediate future the prospects for Spanish iron and steel production are bright."

Foreign Credit Insurance

Announcement has been made of the organization of a mutual company for the insurance of credits in foreign countries. The new company is to be known as the American Manufacturers' Foreign Credit Insurance Exchange. The purpose will be to supply adequate information on the financial status of foreign merchants and a reasonable safeguard in individual business transactions. Being a company organized on reciprocal lines, the insurance will be written at *net cost* and not for profit.

The organization of the exchange is the result of several years' search by various State and trade associations, for a ways and means to solve the problem of foreign credits. At the annual meeting of the Foreign Trade Council at Cincinnati three years ago, George R. Meyercord, first vice-president of the Illinois Manufacturers' Association, and president of the American Manufacturers' Foreign Credit Underwriters, presented a rough plan for the insurance of foreign credits. Since then the foreign trade committee of the Illinois Manufacturers' Association, in conjunction with associations such as the Tanners' Council, has been working to whip into shape a flexible and effective plan to provide such a service to the American manufacturer.

The net result is that there has been formed by officials of the Illinois Manufacturers' Association, and with its approval and indorsement, the American Manufacturers' Foreign Credit Insurance Exchange. Full particulars may be obtained from John M. Glenn, secretary of the Illinois Manufacturers' Association, 76 West Monroe Street, Chicago.

Steel Making in France

WASHINGTON, May 18.—With plenty of iron, but an insufficient amount of coal, the French iron and steel industry is in much the same position as before the war. A detailed analysis of the situation has just been forwarded by Consul Ernest L. Ives from Paris. Mr. Ives tells at length of the conditions in the industry in France and of the various developments during, and growing out of the war.

Alsace-Lorraine produced in the first six months of 1919, 44.6 per cent of the iron, 32.1 per cent of the steel, and 28.4 per cent of the finished products, manufactured in all France.

Pittsburgh Foundrymen's Association

The annual meeting of the Pittsburgh Foundrymen's Association was held in the Hotel Chatham, that city, Monday evening, May 17. W. E. Moore, W. E. Moore & Co., consulting engineers, Union Bank Building, Pittsburgh, presented a paper on "Rapid Type Electric Foundry Furnaces." The annual election of officers was also held at this meeting. A. J. Hartman, United Engineering & Foundry Co., was elected president; T. H. Clay, Allegheny Steel Co., Brackenridge, Pa., vice-president; Wm. J. Brant, re-elected treasurer and Bayard Phillips, Phillips-McClaren Co., re-elected secretary. An executive committee was also elected consisting of J. S. McCormick, J. S. McCormick & Co.; H. P. Spilker, Sterritt-Thomas Foundry Co.; John Field, Union Steel Casting Co.; John W. Guay, Ft. Pitt Steel Casting Co.; A. M. Fulton, Ft. Pitt Malleable Iron Co.

The Baltimore Ordnance Salvage Board will hold an auction at the Bartlett-Hayward Park plant, Baltimore, Friday, May 28, when all the machinery, equipment and materials at this plant will be sold.

SPEED OF METAL ARC WELDING

Results of Tests Conducted for the Emergency Fleet Corporation

The speed of metal arc welding was discussed in a paper prepared by William Spraragen, department of electrical engineering, University of Washington, at a meeting of the American Welding Society, New York, April 22. A digest of the paper which presents the results of extensive tests conducted for the welding committee of the Emergency Fleet Corporation during the war is given below.

One of the most fundamental problems in the application of welding is to be able to compute the time of welding and to know upon what factors this time depends. The usual custom has been to express the time of arc welding in feet per hour for different thicknesses of material. When one attempts to use these figures as a basis for computing as to the cost of doing a given piece of work, he finds this information is too vague to be of value.

Obviously the number of feet that could be arc welded in an hour for a definite thickness of plate would depend very largely upon the type of joint that was involved. These differences could partly be avoided by expressing the data on the speed of arc welding in pounds of metal deposited per hour. It would then only be necessary to divide the pounds of metal that could be deposited per hour by the weight of added metal that would be occupied, say per foot of weld, in order to determine quite accurately the rate in feet per hour of welding the particular joint in question. In estimating this volume, it would be advisable to add 10 to 20 per cent to allow for the fact that the added material rises somewhat above the surface and is consequently of a somewhat larger cross section.

The average results of a vast amount of data show that an operator can deposit about 1.8 lb. of metal per hr. in the shop; for outside work, an operator will average in general not more than 1.2 lb. per hr.

In welding up some 10 tons of ship plates for test purposes, it was found that on the average 70 per cent of the weight of the electrodes is deposited in the weld, 12 per cent is burned or vaporized and the remainder, 18 per cent, is wasted as short ends. The amount of power that woud be required depends largely on the type of apparatus used, and the labor cost is a variable quantity depending on the local conditions.

Data obtained on the time, metal and current used with welds of different bevels, indicated that the advantages claimed by the American traditions (as compared with British practice which permits the use of smaller angles) for the large opening are rather questionable if the time, electrode material and power saved by the smaller angle of bevel are also taken into account. Obviously one could have too small an opening in that the operator would not have sufficient room to operate his electrode. This point seems to have been reached for a total opening less than 60 deg.

There is further basis for belief that a shoulder in place of the heretofore commonly used sharp bottom edge bevel will constitute a material gain not only in saving welding material, but also in the quality of the weld. The sharp bottom edge is always melted away during the welding process, leaving a larger opening than is necessary or even desirable.

Some excellent arc welding is being done with no preparation of the edges at all. The parts are lined up with a slight opening between them and two operators are employed, one located at each side of the weld.

The recommended practice of current and size of metallic electrode in welding mild steel plate of different thicknesses is given as follows:

Electrode Diam., In.	Plate Thickness, In.	Amperes
1/16	up to ⅛	25-50
3/32	up to ¼	50-90
⅛	3/16-½	75-160
5/32	3/16 up	125-200
3/16	½ up	175-250

In general the larger sizes of electrodes and currents would give a greater rate of deposit, but would require greater skill of the operator.

It was found that where an experienced operator is employed there is very little to choose between the merits of alternating current and direct current welding in so far as the speed is concerned.

Proposed Anglo-American Standards for Rolled Steel Shapes

It may not be generally realized that approximately 75 per cent of the world's demand for steel is specified to either American or British standards, but unfortunately the standards in vogue in these two countries and their dependencies have hitherto varied to such an extent as to introduce annoying difficulties in the way of interchangeability. The rolled steel shapes used in building structures, bridges, railroad cars and ships are notable in their points of difference, for not only do their contours and ranges vary but a different language is used in dimensioning their thicknesses. While some steps were taken during the war looking to the adoption of international standards for shapes used in shipbuilding, these were primarily of an emergency nature and did not attempt to cover other branches of industry.

During 1919 the British Engineering Standards Association undertook the revision of their standards for rolled steel shapes, and following a visit of their secretary to this country they sent a formal invitation to the American Engineering Standards Committee to cooperate in the possible adoption of Anglo-American standards for these shapes. Under the auspices of the American body the following organizations were requested to confer on the proposed standardization: United States Navy, Association of American Steel Manufacturers, American Bureau of Shipping, American Society of Civil Engineers, American Railroad Association, Society of Naval Architects and Marine Engineers and the Railway Car Manufacturers' Association.

All of these organizations accepted the invitation, with the exception of the American Railroad Association, which is not able to act at this time, but may do so later on. The Canadian Engineering Standards Association has also been invited to co-operate, but has so far not been able to do so actively. A number of conferences have been held and on April 27 the committee formulated a complete preliminary report for transmission to the British Engineering Standards Association as a basis for discussion on common Anglo-American standards.

The representatives are as follows:

United States Navy: Commander C. M. Simmers, Lieut.-Com. H. D. Rouzer.

Association of American Steel Manufacturers: R. B. Woodworth (chairman), G. H. Blakeley, G. E. Thackray.

American Bureau of Shipping: Capt. C. A. McAllister, David Arnott, John Martin.

American Society of Civil Engineers: J. H. Edwards, J. B. French, H. G. Balcom.

Society of Naval Architects and Marine Engineers: Fred T. Llewellyn, E. H. Rigg, J. W. Stewart.

Railway Car Manufacturers' Association: A. E. Ostrander.

The representatives of the various organizations are known as the "sectional committee on steel shapes" of the joint sponsor bodies—the American Society of Civil Engineers, the Association of American Steel Manufacturers and the Society of Naval Architects and Marine Engineers—and they desire to get a full and free discussion of the whole subject by anyone interested. Communications should be addressed to Dr. P. G. Agnew, secretary American Engineering Standards Committee, 29 West Thirty-ninth Street, New York City.

Bethlehem's Sheet and Tin Plate Mills

The New Sheet Mills and the Enlarged Tin Plate Plant at Sparrows Point, Md.

THE accompanying drawing shows the arrangement of the new sheet and jobbing mills built by the Bethlehem Steel Co. at its Maryland plant, Sparrows Point, Md. Following is a description of the arrangement and equipment of these mills, together with an account of the enlarged tin plate department of the Maryland plant:

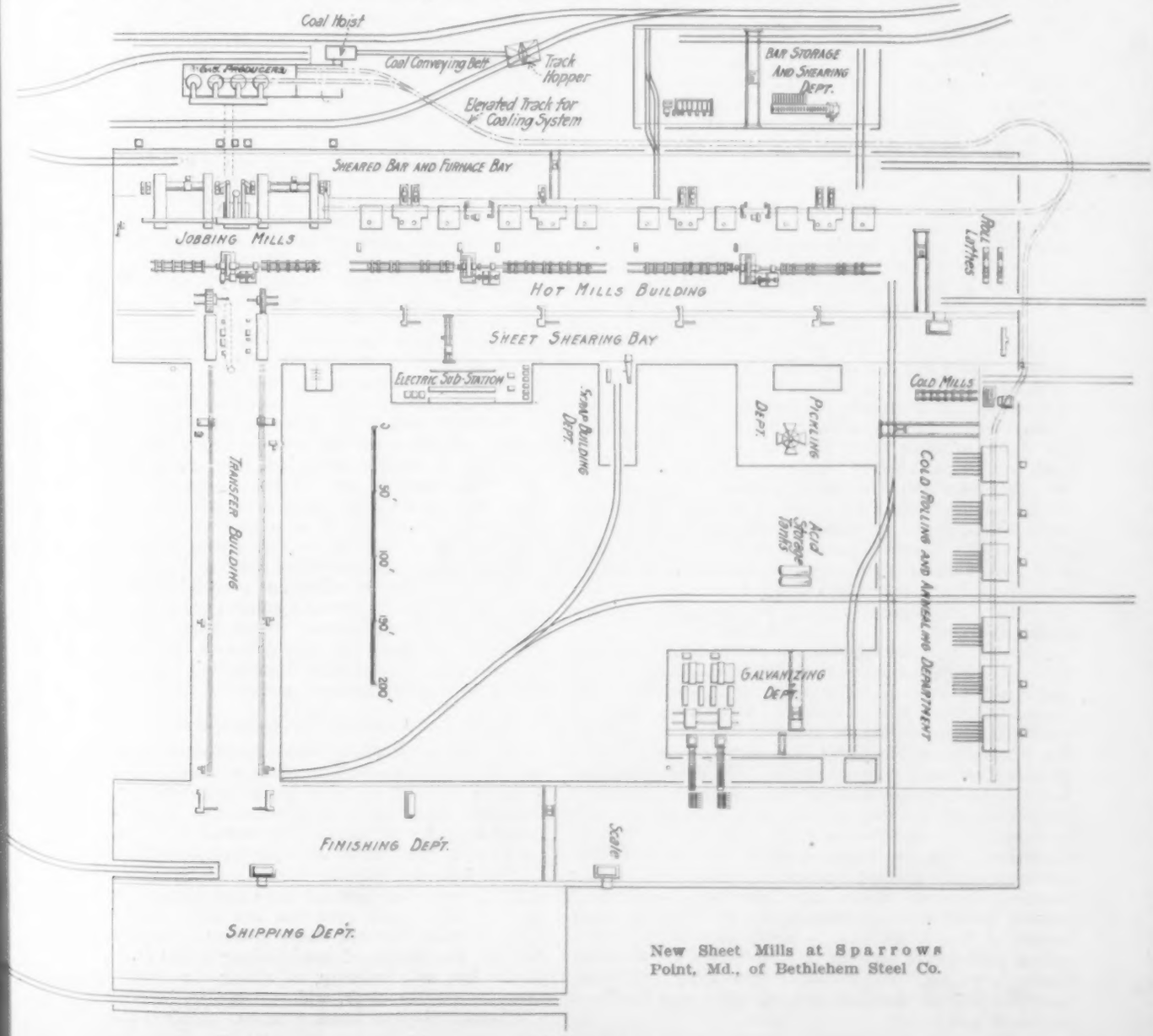
The hot mill building, the finishing building and the two buildings connecting them, namely, the transfer building and the annealing building, form a hollow square. In the court, or inside of this square, are located the pickling building and an electric sub-station, adjoining the shearing bay, also a galvanizing building, adjoining the finishing building.

The hot mill building consists of three divisions, a span of 60 ft. over the furnaces and sheared bar storage, the main span of 70 ft. over the hot mills, and a span of 39 ft. over the sheet shearing bay. The total width of the hot mill building is 169 ft., and the length 728 ft.

At each end of the hot mill building, leading off from the sheet shearing bay at right angles, there are buildings in which the product of the hot mills is handled preparatory to becoming the finished product. One is the transfer building, of 70-ft. span, in which is located the blue annealing furnaces for the jobbing mills, the transfer and cooling tables and finally the shears. The other is the cold rolling and annealing building, an 84-ft. main span and 28-ft. wide leanto. Both of these buildings are 336 ft. long, and lead into a finishing building having an 80-ft. span, and a length equal to the hot mill building. At the side of the finishing building is a shipping building of 80-ft. main span with a 23-ft. leanto, and in the latter is a depressed track and shipping dock, 8 ft. 6 in. wide on one side of the track. The length of the shipping building and its leanto is 364 ft.

The building for the storage of sheet bars and shearing of same is located at the west side of the hot mill building. It is 80 ft. of span by 196 ft. long.

All buildings are structural steel frame, and have the Aiken roof, consisting of alternate high and low



New Sheet Mills at Sparrows Point, Md., of Bethlehem Steel Co.

bays, which form monitors, the sides of which are provided with continuous window sash, giving an abundance of light and ventilation. The roof is gypsum slab, covered with tar paper, overlaid with crushed slag. The side walls are red brick, 9 in. thick, laid in cement mortar. Windows in side walls and monitors are all steel sash, glazed with wire ribbed glass ¼ in. thick. To provide free circulation of air to sweep over the floor there are doorways in the side walls, two to each bay. The doorways are 7 ft. wide, and have rolling steel doors that can be raised or lowered.

The Sheet Mill Equipment

The hot mill trains are divided into three groups, each group driven by an electric motor through a set of single reduction gears having double helical cut teeth, the arrangement being such that there are only two finishing mills on each side of a drive.

Group No. 1, located at the south of the hot mill building, consists of two jobbing mills, one on each side of the gear drive. The housing stands of the two jobbing mills, beginning at the south side, are 31 x 36-in. pinions; 30 x 68-in. roughing rolls; 30 x 72-in. finishing rolls, gear drive; 30 x 60-in. finishing rolls; 30 x 60-in. roughing rolls and 31 x 36-in. pinions.

Group No. 2, next to the jobbing mills, consists of four sheet mills. The housing stands, named in the same order as for the jobbing mills are: 30 x 40-in. finishing rolls; 30 x 40-in. jump roughing rolls; 30 x 36-in, jump roughing rolls; 30 x 36-in. finishing rolls; gear drive; 30 x 48-in. finishing rolls; 30 x 48-in. balanced roughing rolls; 31 x 38-in. pinions; 30 x 56-in. jump roughing rolls, and 30 x 56-in. finishing rolls.

Group No. 3 consists of four sheet mills. The housing stands are: 30 x 56-in. finishing rolls, 30 x 56-in. jump roughing rolls, 31 x 36-in. pinions, 31 x 48-in. balanced roughing rolls, 30 x 48-in. finishing rolls, gear drive, 30 x 36-in. finishing rolls, 30 x 36-in. jump roughing rolls, 30 x 40-in. jump roughing rolls, and 30 x 40-in. finishing rolls.

The cold mill train consists of four stands of rolls, two 26 x 48-in. and two 26 x 64-in., all being driven by an electric motor through a set of single reduction gears having double helical cut teeth.

The main mill driving motors are all General Electric three-phase, 25-cycle, 6600-volt (245 r.p.m. full load), slip ring, induction type machines. The jobbing mill motor is rated 1150 hp.; each of the sheet mill driving motors is rated 1000 hp.; and the cold roll motor is rated 500 hp., all ratings being 35 deg. C. rise on continuous full load. These motors have dust-proof end covers and ventilation is furnished from the same blowers which supply cooling air to the mill operators. Alongside of each motor is a master controller and push button for starting, stopping and reversing, and the remainder of the control equipment is installed in the sub-station building, which is separate from the main building and provides a dust-proof location for this control. Power is received at the substation over a double 6600-volt, three-phase line, and is transformed and converted into 550-volt, three-phase and 250-volt, direct-current energy, for the mill auxiliary motor equipment.

For the two jobbing mills there are four regenerative heating furnaces, each having three doors, and a hearth 7 ft. 6 in. wide by 20 ft. long. Between the second and third furnace there is a reheating furnace, and on the opposite side of the mill from the regenerative furnaces and reheating furnace there are two continuous blue annealing furnaces. All seven of these furnaces are supplied with gas from four gas producers located in the building at the west side of hot mill building. For the sheet mills there is on each side of the drive, or to two finishing mills, one double-hearth continuous pair heating furnace and two sheet-heating furnaces. All of these furnaces have mechanical stokers, which are fed from overhead bins, and each hearth of a pair furnace is equipped with a motor-driven pusher for shoving the bars into the furnace. There are six double-hearth annealing furnaces, equipped with mechanical stokers, which are fed from overhead bins.

In the sheet shearing bay there are four 156-in. direct motor-driven squaring shears, and in the finishing department, at the end of the transfer table and cooling tables, there are two shears of the same size as those in the sheet-shearing bay. These two shears cut the plates that are made on the jobbing mills, the plates being carried from the continuous annealing furnaces by roller chain conveyors which first enter the plates in a leveling machine and from thence to the shears. In the floor around the shears there are stakes that carry castors at the top, making it possible to handle the plates with very little effort.

In the bar storage and shearing department there is one gang shear, motor driven, capable of cutting six or eight standard sheet bars at one stroke of the ram. There is in the same building one shear capable of cutting the light medium size of slabs for the jobbing mills. Slabs for the jobbing mill of greater cross-section than 12 x 2 in. will be cut to desired lengths at the company's 40-in. blooming mill, where the slabs are rolled.

At one end of the hot mill building there are two 34-in. direct motor-driven roll lathes. Alongside of these roll lathes in the sheet shearing bay there is an automatic direct motor driven knife grinding machine for sharpening the knives of the squaring shears.

In the pickling department there is one four-arm steam-operated pickling machine, and in the galvanizing department there are two complete galvanizing units, each consisting of motor-operated plunger type picklers, two water tanks for storage of sheets, a double tank in front of the galvanizing machine, and the complete galvanizing machine with conveyors, leveler, cooling wheel, etc. The levelers and the cooling wheels stand in the finishing department, and when the sheets leave the cooling wheel they are ready for distribution either to the corrugating rolls or direct to the cars for loading.

All the electric traveling cranes in the plant are of heavy mill type construction, practically all the castings being of steel. The crane in the hot mill building is 40-ton capacity main hoist and 10-ton auxiliary; in the sheared bar and furnace bay 10-ton hoist; in the sheet shearing bay 10-ton hoist; in the cold rolling and annealing building 40-ton main hoist and 10-ton auxiliary; in the finishing building 15-ton hoist; in the main bay of galvanizing building 15-ton hoist, and in leanto of same building 15-ton hoist. In addition to the standard electric traveling cranes there are two charging cranes for charging and drawing slabs at furnaces of the jobbing mills. These charging cranes are equipped with side-gripping tongs, and the tongs have a vertical movement, also revolving.

The coal used in the gas producers and mechanical stokers of the sheet and pair furnaces, also annealing furnaces, is received at the plant in standard railroad cars. The coal is dumped into a track hopper and from there carried by an inclined conveying belt to a coal crusher, and thence to a skip hoist that carries it to the top of coal bunker located at one end of the gas producer building. The coal is drawn from the bunker into cars running on a 36-in gage elevated track system, some of them going to bins over the top of the gas producers, and others going to bins over the top of the sheet and pair furnaces, also the annealing furnaces. An electric locomotive, trolley type, is used for hauling the coal cars.

Enlarged Tin Plate Plant

The tin plate plant, which is situated alongside of the sheet mill, was completed as a 12-mill plant in the summer of 1917, the first plate being rolled July 26. In June, 1919, plans were made and work was put under way for an addition of twelve more mills, and on April 1, 1920, these were put in operation.

The hot mill building consists of three spans: one a 42-ft. span over the furnaces and sheared bar storage; a 70-ft. span over the hot mills, and a 35-ft. span over the opening floor, making a total width of 147 ft. The length of the building is 980 ft. Midway of the hot mill building, adjoining the opening floor, there is a room 45 ft. wide by 196 ft. long, in which are located the two black picklers. Against this room, and paralleling the hot mill building, there is a build-

ing of 80-ft. main span and 35-ft. leanto, in which are located the cold rolling mills and annealing furnaces. Sixty feet away from the cold rolling and annealing building and parallel to it is the tinning house with the assorting and shipping rooms. This building is 132 ft. wide by 840 ft. long. An aisle 84 ft. wide by 60 ft. long, in which are located the white picklers, connects the cold rolling and annealing building with the tin house.

The buildings are the same type as the sheet mill buildings, being of structural steel frame, made with Aiken roof, gypsum slab with tar and slag roof covering, brick side walls and steel sash throughout.

The twenty-four hot mills are in one row, and to every group of six mills there is one drive, the drive being located so three mills are on each side. Beyond each of the end mills of a group there is a "drag" to prevent backlash of rolls. The drive consists of a 1000-hp. electric motor, 6600 volts, and a single reduction gear set, the latter having double helical cut teeth. The motors run at 234 r.p.m., and the rolls at 30 r.p.m. Over the hot mills there are two electric traveling cranes, each of 25 tons capacity.

The combination sheet and pair furnaces are equipped with mechanical stokers for burning coal. The floors between the furnaces and the hot mills are provided with water-cooled standings, which, with an air blast cooling system, make conditions comfortable for working.

Behind the furnaces there are two electric traveling cranes, 5 tons capacity each, for carrying coal and the sheared sheet bars to the furnaces. Coal is brought in railroad cars on a track outside the building, and is dumped into pockets which extend into the building behind the furnaces. The cranes take the coal from these pockets to a bunker located behind each furnace.

Leading off from the bay of buildings, in which these two cranes are located, there is a building 70 ft. wide by 280 ft. long, where long sheet bars are stored and sheared to size. The shears are in the near end of this building, and the sheared bars can be picked up by the two 5-ton cranes and carried to the furnaces.

The cold rolls, seven trains of three stands each, are actuated from a rope drive. The pulley or small wheel of the rope drive is driven through a single reduction gear set by an electric motor of 1200 hp. Conveyors are provided between the stands of cold rolls to carry the plate from one to the other.

There are six double hearth annealing furnaces for the annealing of black plates, and four double hearth annealing furnaces for the annealing of white plates. All the annealing furnaces are equipped with mechanically operated stokers for burning coal, and there are two electrically operated charging machines for putting annealing boxes into the furnaces and taking them out. Two 25-ton electric traveling cranes have command over the entire main bay of the annealing building, and are used for changing rolls of the cold mills as well as for handling the plates, annealing boxes, bottoms, etc. Two boilers, stoker fired, are located in the leanto of the annealing building, in line with the annealing furnaces, and supply steam to the picklers and to other parts of the plant.

In the tinning house there are forty sets of tinning machines, with their conveyors and cleaning machines. The tinning machines, conveyors and cleaning machines are driven by belt from a common line shaft, said shaft being divided in four sections and each section driven by a separate motor. Beyond the cleaning machines there are the inspection and assorting tables, shears and other auxiliaries. Beyond the assorting and inspection tables there is ample room for taking care of the product after it is boxed, and at the farthest side of the building there is a depressed track for the cars in which shipments are made.

W. S. Bell & Co. of New York have virtually closed a deal to take over the plant of the Louisville Steel & Iron Co., Louisville, Ky., it being planned to enlarge the plant to manufacture steel bars. The plant is equipped with complete puddling and busheling furnaces, rolls, machinery, etc.

INDORSES SHOP COUNCILS

Herbert Hoover Gives His Views on Labor Questions to Senate Committee

WASHINGTON, May 18.—Development of the shop councils recommended by the President's second industrial conference as a means of adjusting labor disputes was approved by Herbert Hoover in testimony before the Senate committee on education and labor.

Mr. Hoover, in commenting on the Kansas industrial court law, said that his opinion was that it could not succeed. Mr. Hoover took the position that public opinion was the only pressure to be brought upon collective bargaining, and that differences could not be adjusted by recourse to the courts.

"The problem must be solved step by step, and it will take time," said Mr. Hoover. "I do not believe that the relationship between labor and capital can ever be settled by any form of legal repression, because that leads ultimately to the jail as a means of enforcement. Public opinion and good will are the forces we must depend on for enforcement of the right sort of settlements. Repression leads to the border of martyrdom and tends to make for compulsory employment and a compulsory wage."

Opposes Whitley Plan in United States

Mr. Hoover opposed the use in the United States of the Whitley shop council plan of England. Nothing could be more dangerous than introduction of that plan here, he said.

It developed during the hearing that the report of the President's second industrial conference never had been transmitted by the President to Congress. Senator Kenyon, chairman of the committee, asked Mr. Hoover if he knew what the President's views were on the report. Mr. Hoover said that he had not the remotest idea.

Agitation for anti-strike legislation has not been dropped in Congress following the failure of the Senate to obtain action along this line in the transportation act. Senator Poindexter's bill to prevent railroad strikes has been ordered favorably reported by the Senate committee on interstate commerce which some months ago approved similar legislation for incorporation in the transportation act. The bill provides that interference with instrumentalities of interstate commerce, designed to delay or obstruct it, by advising, soliciting, speaking for or circulating literature favoring strikes, shall be a felony punishable with fine of $10,000 or 10 years' imprisonment, or both; and that prevention of employees of interstate carrier from working, by force or violence, or threats, shall be a felony subject to $15,000 fine or 15 years' imprisonment, or both; and that injuring or destroying property employed in interstate commerce shall be a felony subject to $10,000 fine or 15 years' imprisonment, or both.

O. F. S.

Pittsburgh Companies Allied

The Schaffer Engineering & Equipment Co., to provide for the expansion of its business and to obtain ample plant facilities, has sold a large block of its capital stock to the Fawcus Machine Co., Pittsburgh. The Schaffer company's line of machinery includes poidometers, hydrators, coal injectors and screens.

The Fawcus Machine Co. manufactures gears and special types of machinery, with large plants at Pittsburgh and Ford City, Pa. The officers of the Fawcus company, who will take active interest in the Schaffer organization, are A. F. Cooke, specialist in machine shop practice; Eliot A. Kebler, who has been identified with iron manufacturing and selling companies for many years; and A. A. Alles, Jr., who specializes in unifying and stabilizing costs.

The new officers and directors of the Schaffer Engineering & Equipment Co. are A. F. Cooke, president and general manager; J. C. Schaffer, vice-president; Eliot A. Kebler, vice-president; A. A. Alles, Jr., treasurer, and Waller Crow, secretary.

SHIP STEEL SOLD

Navy Department Disposes of a Considerable Tonnage—Some Withdrawn

WASHINGTON, May 18.—The Navy Department has sold approximately 17,000 net tons of ship steel out of a total of approximately 26,000 tons offered for sale in its latest catalog. Bids for the remaining 9000 tons were rejected as too low or because the items had to be withdrawn for use in the construction work of the Navy. The total proceeds of the sale approximate $1,075,000.

Practically all the items of ribbed floor plate as well as of sheet steel were withdrawn for use in the building of Navy vessels now on the ways.

More than half of the steel offered was purchased by the Barde Steel Products Corporation, New York. It was awarded approximately 7000 net tons of steel in west coast yards on a bid of $55.26 per ton. It will also receive 2000 net tons in east coast yards at a price of $50.26.

Among the larger lots, the Federal Export Corporation, New York, was awarded 11 tons of corrugated galvanized sheets at $135 per net ton; 21 tons at $145; 14,000 tons of medium galvanized angles at $80; 16 tons of medium black flats at $67; 43 tons of medium black flats at $55; 68 tons medium flat black bars at $55; 18,000 tons of beams at $55; 180,000 tons galvanized soft sheets at from $143 to $146 per net ton, and 33,000 tons of channels at $55 per net ton.

The catalog of items awarded covers such a wide range of small lots of varied specifications and scattered locations that it is difficult to summarize the results of the sale. Location, characteristics and size of the lots played a large part in determining the prices.

E. P. Sanderson Co., Boston, received approximately 83 tons of medium flat black bars at $60 per ton; 23 tons medium black flats at the same price; 10 tons medium black rounds at $65; 4½ tons medium black squares at $60; 14 tons medium rivet rounds at $100; 170 tons medium rivet rounds at $80; and 5 tons extra soft rounds at $50.

Woodward, Wight & Co., New Orleans, were awarded 82 tons medium galvanized steel plates at $59; 10 tons medium black angles at $57; 9 tons medium black hexagons at $52; 3 tons medium black flats at $57; and 25 tons medium black rounds at $57.

The New York Engineering Co., New York, secured 10 tons medium steel plate at $70; 9 tons galvanized medium plates at $100; 6 tons high tensile galvanized plates at $90; 2 tons medium flat black bars at $70; and 7 tons heat treated rounds at $80.

The New Jersey Engineering & Supply Co., Passaic, N. J., received 14 tons medium black flats, 9 tons medium flat black bars, 10 tons medium black rounds, 6 tons medium black squares, 7 tons medium rivet rounds, 2½ tons medium channels, at $60 per net ton.

Among the other successful bidders were: Charles W. Fisher, Hamilton & Chambers Co., Inc., John A. Crowley, Parker Sheet Metal Works, Inc., Jaburg Bros., Adams Steel Products Corporation, Irving Iron Works, all of New York; Steel Sales Corporation, Knisely Bros., Harris Bros. Co. of Chicago; Joseph P. Cattie & Bros., Philadelphia Steel & Iron Co., Belmont Iron Works, J. W. Paxson Co., Morris Wheeler & Co., F. R. Phillips & Sons Co. of Philadelphia; Morris M. Fineberg, E. Van Noorden & Co., M. A. Palmer Co., P. F. McDonald & Co., Boston; Dietrich Bros., DeVed & Sons Co., Baltimore; Harry Brainum, Jr., William H. Nicholls Co., Inc., Brooklyn; General Railway Signal Co., Rochester, N. Y.; York Safe & Lock Co., York, Pa.; Eagleston-Parke, Inc., Norfolk, Va.; Atlanta Bolt & Steel Products Co., Atlanta, Ga.; Queen City Iron & Metal Co., Charlotte, N. C.; A. L. Smith Iron Works, Chelsea, Mass.; American Mine Door Co., Canton, Ohio; C. H. Fessler, Covington, Ky.; Morse Chain Co., Ithaca, N. Y.; Donald B. Howard Heater Co., Des Moines, Iowa; Duluth Iron & Metal Co., Duluth, Minn.; J. Duncan Co., Everett, Mass.; Cruse-Kemper Co., Ambler, Pa.; C. D. Franke & Co., Inc., Charleston, S. C.; Truscon Steel Co., Youngstown, Ohio; Union Steel Products Co., Ltd., Albion, Mich.; C. S. Mersick & Co., New Haven, Conn.; Hunter & Havens, Bridgeport, Conn.; Hirsch Rolling Mill Co., St. Louis; Schawbacher Hardware Co., Seattle Hardware Co. and A. A. Hilton, all of Seattle, Wash.; Frank Mossberg Co., Attleboro, Mass.; B. Enushevsky & Son, Toronto, Canada.

The Navy Department has not yet determined just when its next sale will be made. It still has a considerable surplus of steel left in addition to the portion remaining unsold from the May sale. The largest item in the next sale will be alloy steel.

Surplus Steel and Machinery Sold by the Government

Nearly 10,000,000 lb. of steel was disposed of at auction at the Material Disposal and Salvage Division of the U. S. Air Service at Dayton, Ohio, the week of May 3. Motors, machine tools, assorted hardware, kitchen ware, paints and oils were also disposed of at the same sale, which attracted bidders from all over the country. The sale was conducted by the firm of Smith & Jaffe, New York, with Phillip Smith disposing of the goods. On the first and second day of the sale manufacturers in need of certain articles bid the prices ay up and when the article was knocked down to them announced their intention of taking only a portion of the lot sold.

Great dissatisfaction with this procedure was expressed by outside bidders, with the result that the highest bidder was obliged to take at least 10 per cent of the lot bid in, the remainder being offered at the same price, and in case nobody cared to take it at the high bid, it was again put up and the high bid accepted for the rest of the lot. Practically 90 per cent of the steel was bid in by five firms, the Steel Sales Corporation, Chicago; Garden City Plating & Manufacturing Co., Chicago; Edgar T. Ward & Sons, Philadelphia; Muncie Machinery & Supply Co., Muncie, Ind., and the Emmerman Co., Erie, Pa. Prices paid for steel were high, and when a big lot was put up, bidding was lively. For instance, a carloard lot of ⅜-in. cold-rolled rounds, S. A. E. 1020, was disposed of to the Muncie Machinery & Supply Co. at 8c. per lb. A lot approximating 40 tons of ½-in. round brought 11c. from the same buyer. A lot of 50 tons of cold-rolled strip steel brought 9½c. Prices on terne plate averaged between 12 and 14c. It is estimated that the proceeds of the sale amounted to approximately $2,000,000, though no official figures have been given out.

Buyers attending the sale at Dayton were very favorably impressed with the desirability of the material offered, and the opinion was freely expressed that it should have been placed on the market some months ago.

Freight Rate Advance Indorsed

Daniel Willard, president of the Baltimore & Ohio Railroad, and chairman of the sub-committee of the general committee, official classification territory, to present the case of the railroads with regard to increased revenues before the Interstate Commerce Commission, explaining the necessity for increased revenue before the Cincinnati Chamber of Commerce on Wednesday of last week, stated that the railroads in the Eastern territory at the present time were short 100,000 cars, 2000 locomotives and 5000 passenger coaches, and that, without increased revenues, it would be impossible for the railroads to purchase equipment to make up this deficit. Mr. Willard continued to speak along the lines of his statement published in THE IRON AGE last week. He said that should the revenues of the roads not be increased it will mean that a large percentage of them will be forced into the hands of a receiver, as at the present time many of them were operating at a loss, and at the best some of them were only earning one-half of 1 per cent on their capital.

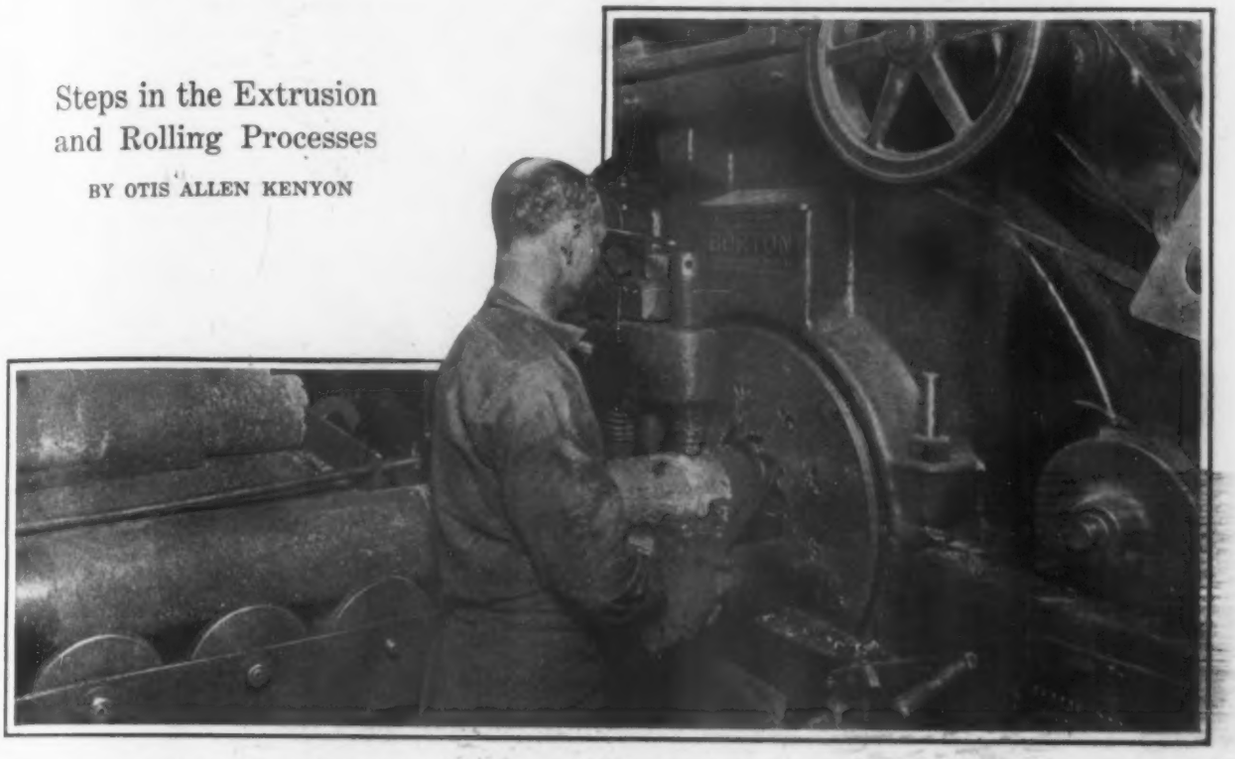
At the conclusion of Mr. Willard's address a resolution was passed that the Cincinnati Chamber of Commerce recommend to the board of directors that they give their support to the railroads' application for an increase of 30 per cent in freight rates, to become effective at the time the roads cease operating under the Government guaranteed standard return, which expires on Sept. 1, 1920.

The Standard Oil Co., which took bids for 1100 tons for a new warehouse and office building at Fourth and Sycamore streets, Milwaukee, has practically decided to hold the project in abeyance pending more stabilized conditions in the building construction field. The foundations, now under way, will be completed, but no further work will be done for the present.

Making Brass Rods and Wire Illustrated*

Steps in the Extrusion and Rolling Processes

BY OTIS ALLEN KENYON



Sawing Off the Gate of Cylindrical Billets, Wh ich Are Transformed by the Extrusion Process

THE rods and wire made by the Bridgeport Brass Co. are produced by two different processes, namely: The extrusion process and the rolling process. The extrusion process is employed for all brass rods and wire, while the rolling process is employed for the production of phono-electric trolley wire, turbine blading and other special alloys.

Extrusion Process

The brass billets are cast in cylindrical billets from induction type furnaces and delivered to special saws, where the gate is cut off as here shown. The sawed billets are then delivered to a heating furnace, where they are brought to a state of plasticity.

A hot billet is then inserted in the cylinder of the extrusion machine and an hydraulically operated plunger forces the plastic metal through dies, producing rods. In the accompanying picture of the extrusion machine may be seen in the background the billet heating furnace. A small jib crane serves to transfer the hot billets from the furnace to the machine. The operator at the left controls the hydraulic plunger and all other operations of the machine. In the center foreground is a pile of unused portions of the billets, on the surface of which may be seen (looking like buttons on the disks) the broken ends of the five rods that have been extruded from each billet.

Extruded rods are next delivered to the draw benches and drawn to size, as shown in another reproduced photograph, which illustrates a chain type of draw bench operated by reversing motors. As the machine was in operation when the picture was taken parts of it are out of focus.

Large size rods are sprung and straightened in a special machine. This consists of three pairs of rollers mounted in spiral form in a frame which rotates about the rod. The action of these rollers is such as to spring the rod in all directions and finally straighten it, and the effect is to equalize the strains produced in drawing, and thus improve the quality of the product.

Smaller size rods are straightened from coils in an automatic machine and cut to length as also shown.

Rolling Process

The billets for the rolling mill are cast from the indirect arc type of electric furnace and are delivered directly to the heating furnaces without cutting off the gates. However, for some classes of product where the highest possible degree of quality is required, the surface of the billet is turned off in a lathe. One of the illustrations shows phono-electric billets entering a heating furnace.

By far the largest portion of the product of the rolling mill is phono-electric rod intended for drawing into phono-electric wire. This particular alloy has been on the market for almost a quarter of a century and has established itself the world over as a trolley wire of great wearing qualities. Its conductivity is somewhat greater than half as much as copper, but its strength and arc resisting qualities are so much superior to copper that in railroad electrifications where the trolley pressures and speeds are high it will last years where copper will last months.

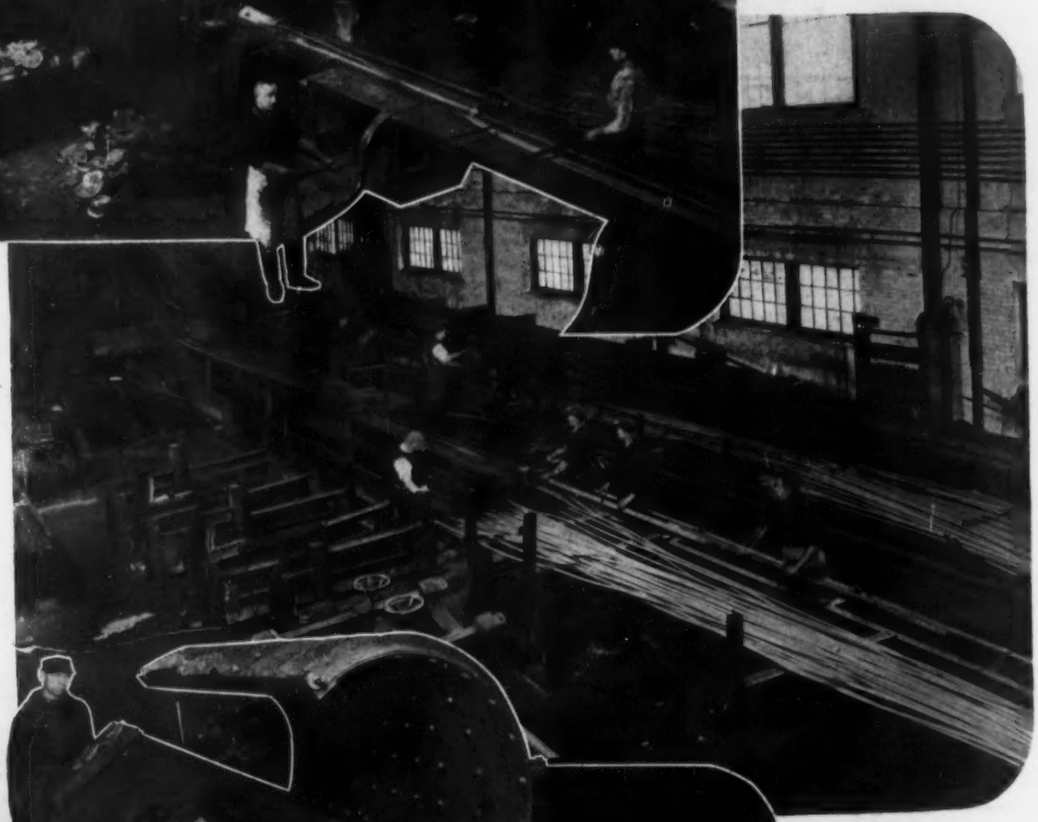
Views Before and After Passes

The views include one of a phono-electric billet being taken from the furnace preparatory to introducing it into the first pass of the rolls. Another shows the same billet after the third pass through

*Sixth and last of a series of articles illustrating brass sheet, tube and rod manufacturing, the others appearing Feb. 19, March 18 and 25, April 15 and 22.

Billets Entering the Heating Furnace Near Extrusion Machine

Extrusion Machine in Operation



Drawing Brass Rods by Means of a Chain Type of Draw Bench

Machine for Springing and Straightening Brass Rods

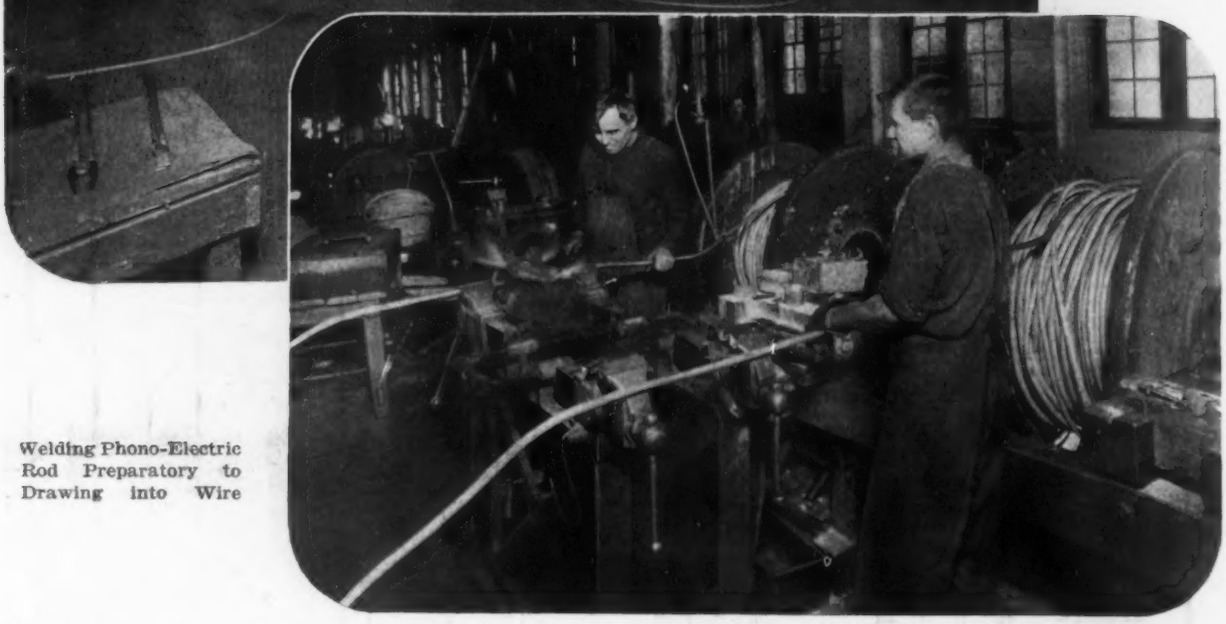
Straightening and Cutting the Smaller Size Brass Rods

Feeding Phono-Electric Billets into Heating Furnace

After the Third Pass of the Billet

Phono - Electric Billet Ready for First Rolling Pass

Next to Last Pass of Billet



Welding Phono-Electric Rod Preparatory to Drawing into Wire

the rolls, and a third shows the same billet just before the last pass when it is wound up on a reel and delivered to the drawing department.

One of the most interesting operations on phono-electric rod is the joining of the rods to make sections of any desired length. This joining process is done by sawing the ends at an acute angle, cleaning the adjacent surfaces with acid and inserting between them a sheet of silver solder. The parts are then bound together with wire and a small heating furnace swung up into position between the two vises that hold the ends of the rods. When the proper temperature has been reached, the operator works more solder into the joint, and when the soldering operation is complete he removes the wires, files off the joint and passes on to the next one. These joints then pass through the dies in the draw benches and it would take an exceedingly careful examination to reveal the location of the joint in the finished wire.

Worcester Polytechnic Institute's Endowment Drive

The Worcester Polytechnic Institute, Worcester, Mass., is conducting a drive to raise an endowment fund of $2,000,000. The half million mark in pledges has been passed. The fund is accumulating in two classes of subscriptions, the one of money to be used as the Institute may deem best, the other in the form of scholarships. The college has been dependent upon the State of Massachusetts for a considerable portion of its income, given as scholarships to pay the tuition of young men of the commonwealth. Of recent years the annual appropriation for the purpose has been $50,000. Under an amendment of the State constitution public moneys can no longer be used for such purpose, so that after this year and next year State support will be withdrawn completely. The scholarships now being pledged will take the place of the State scholarships.

Already $285,000 has been raised in scholarships. The amount includes $35,000 given outright by the United States Steel Corporation, an exception to the Corporation's established practice, made because of the presence in Worcester of the American Steel & Wire Co.'s large works, which have drawn heavily upon the institute's supply of graduate engineers. All other scholarships, rated at $10,000, are from Worcester industries, as follows: Norton Co., $60,000; Graton & Knight Mfg. Co., $40,000; Crompton & Knowles Loom Works, $40,000; Morgan Construction Co., $40,000; Reed & Prince Mfg. Co., $40,000; Heald Machine Co., $20,000; Sanford Riley Stoker Co., $10,000. The amount pledged to date in money for the general endowment fund is $270,742.

Electric Alloy Steel Co. May Move

To offset construction difficulties imposed by the railroad strike, the Electric Alloy Steel Co. at Youngstown, Ohio, is considering the purchase of a plant and removal to a site in Trumbull County, Ohio. To acquire such a property, a special meeting of stockholders was held May 18. The company was organized several months ago with the intention of erecting a new plant, but irregular transportation would delay construction for an indefinite period. Under the proposed plan the company may actively enter the market months in advance of the time it would require to complete a property. It is understood the electric steel plant is located in a western Pennsylvania city and has been engaged in production for some time. It is the purpose to continue operations in the present location and in the meantime prepare the new site for installation of buildings and equipment.

Enthusiastic Foreign Trade Convention

Many Steel Manufacturers Participate in Proceedings—Declaration of Policy Makes Definite Recommendations as to Extension of American Trade

BY A. I. FINDLEY

SAN FRANCISCO, May 15.—Of the 2500 delegates to the Seventh National Foreign Trade Convention, which held the last of its four days' sessions this morning, no less than 900 came from States east of the Mississippi. Such an attendance from the country's most powerful industrial and financial sections is eloquent testimony to the strength and sweep acquired by the movement for foreign trade extension in the past six years. This week's convention was the greatest of the seven in size, in spirit and accomplishment. All the delegates who cross the continent to take part in it are enthusiastic over the demonstration they have had of the possibility, the energy and the high type of business courage and imagination of the Pacific Coast's leaders in trade and industry.

As head of the National Foreign Trade Council since its organization, President James A. Farrell has been to this movement what Judge Gary has been to the American Iron and Steel Institute. He has been the leading figure of this as of all preceding conventions. From the standpoint of the steel trade, this week's gathering was more interesting than any that preceded, because more American steel companies have participated in the export trade in the past year with the intention of becoming permanent factors in that trade, than at any time in the history of the industry.

President Farrell's address at the opening session on "The Relation of Our Industrial Capacity to Our Foreign Trade" was forceful, putting forth views he has been known to entertain as to the policy that must be pursued against the time now close at hand when our manufacturing capacity, which was so greatly extended in war time, will produce much more than can be sold at home. He intimated that with the possible exception of building materials, supply had almost if not quite overtaken demand.

Features of the Program

Among other steel men who had a part in the program were Eugene P. Thomas, president United States Steel Products Co., who read a paper urging that finding ways and means of increasing our imports is absolutely essential to any enduring expansion of our export trade, and C. B. McElhany, vice-president American Steel Export Co., who discussed trade mark protection in our dealings with other countries. W. L. Saunders, chairman Ingersoll-Rand Co., had an interesting paper advocating direct selling in foreign trade and giving the experience of his company. The steel and metal working industries were represented on the list of convention vice-presidents by David J. Champion, Cleveland; Robert Garland, Pittsburgh; H. Sanborn Smith, Birmingham, Ala.; A. I. Findley, New York; J. W. Hook, New York; J. F. Welborn, Denver, Col.; W. W. Nichols, New York; A. T. DeForest, San Francisco; J. C. Watson, Pittsburgh; Andrew Carrigan, San Francisco.

The convention worked hard. There were five general sessions and 14 group meetings. The embarrassment of the average delegate was that two or three meetings he wanted to attend were in session at one time. The discussions for the most part were highly practical. The exchange situation was thoroughly canvassed and the weight of opinion was that no artificial methods or temporary expedients would avail.

Barter, it was shown, had helped in some cases, but results were negligible in the face of world-wide derangement of finance. While on all matters discussed the general tone of comment was hopeful, it was the almost uniform opinion of the bankers who participated that the United States could go but little farther in extending credit to weaker countries of Europe in view of tightening of credits at home and the heavy hand the Government continues to lay upon the profits of industry and trade in every line.

Eastern delegates were greatly impressed by the alertness, the enthusiasm and the aggressive spirit of Pacific Coast business men. At the coast shipyards, a strike has been on since October, organized labor making the mistake of which it has so often been guilty, of pressing unreasonable demands after the peak has been passed. San Francisco yards have built up good working forces in spite of the strike and have scored large gains for the open shop. In that respect labor conditions on the coast are better than in years. In contrast with San Francisco, Puget Sound shipyards show considerable slackening of work, while at Vancouver, very little is being done. Rolling mills on the coast which produce almost exclusively bars and small shapes are running quite full, producing a total of about 1000 tons per day. Open hearth furnaces in California, Oregon and Washington now number 22 and are operating almost entirely on scrap. The problem of scrap supply is getting more difficult and recently local mills have gone as far east as Colorado for melting scrap. The coast needs a blast furnace. While projects for meeting this need have been announced regularly for the past 20 years, none has materialized. Prospects are said to be brighter now, however, than at any time.

Steel Men in Attendance

Among representatives of the steel and allied industries in attendance at the convention are:

E. P. Thomas, president United States Steel Products Co., New York.

Walter S. Tower, Consolidated Steel Corporation, New York.

Robert Radford, president Standard Steel Works Co., Philadelphia.

Roy G. Owens, Lakewood Engineering Co., Cleveland.

Zenas W. Carter, Material Handling Machinery Manufacturers' Association, New York.

M. A. Oudin, International General Electric Co., Schenectady, N. Y.

H. L. Usher, Oliver Iron & Steel Co., Pittsburgh.

C. A. Richards, president American International Steel Corporation, New York.

H. Sanborn Smith, Gulf States Steel Co., Birmingham, Ala.

F. J. Frank, Iron Age Publishing Co., New York.

A. I. Findley, THE IRON AGE, New York.

F. A. Searle, Landers, Frary & Clark, New Britain, Conn.
H. F. Beebe, Winchester Repeating Arms Co., New Haven, Conn.
J. R. McWane, American Cast Iron Pipe Co., Birmingham, Ala.
William Pigott, Seattle, Wash., vice-president Pacific Coast Steel Co.
John D. Fenstermacher, sales manager Columbia Steel Co., San Francisco.
A. T. DeForest, vice-president United States Steel Products Co., San Francisco.
William H. Matthai, vice-president National Enameling & Stamping Co., Baltimore.
William O. Vilter, secretary-treasurer Vilter Mfg. Co., Milwaukee.
Merle J. Trees, Chicago Bridge & Iron Works, Chicago.
B. H. Tripp, Chicago Pneumatic Tool Co., San Francisco.
W. A. Taylor, La Belle Iron Works, San Francisco.
P. R. Thompson, Pacific Coast Steel Co., San Francisco.
J. C. Axelson, general manager Axelson Machine Co., Los Angeles, Cal.
B. C. Ball, president Willamette Iron & Steel Works, Portland, Ore.
Jesse K. Barker, Seattle, Wash., Jones & Laughlin Steel Co.
William Best, Jr., and C. P. Hensley, San Francisco, Jones & Laughlin Steel Co.
H. J. Kiely, Link-Belt Co., New York.
Andrew Carrigan, vice-president and general manager Dunham, Carrigan & Hayden Co., San Francisco.
Thomas C. Ham, New York, export sales department Jones & Laughlin Steel Co.
J. W. Judge, San Francisco, Upson Nut Co. and Bourne-Fuller Co., Cleveland.
George F. Konold, Jr., secretary Warren Tool & Forge Co., Warren, Ohio.
E. W. Kratzer, San Francisco, Oliver Iron & Steel Co.
Charles M. Muchnic, vice-president American Locomotive Sales Corporation, New York.
E. C. Pierce, Brown Hoisting Machinery Co., Cleveland.
W. S. Horner, president National Association Sheet and Tin Plate Manufacturers, Pittsburgh.
A. H. Holliday, export sales manager Jones & Laughlin Steel Co., Pittsburgh.
J. A. Kinkead, San Francisco, Parkesburg Iron Co.
A. Schoonmaker, New York, export sales manager Upson Nut Co.
H. O. Stevens and Carl Schulz, American Rolling Mill Co. of California, San Francisco.
R. W. Seyms, San Francisco, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
C. B. McElhany, American Steel Export Co., New York.
J. F. Welborn, Colorado Fuel & Iron Co., Denver.
William F. Vosmer, Donner Steel, Buffalo.
Isaac W. Frank, United Engineering & Foundry Co., Pittsburgh.
H. E. Stuard, San Francisco, manager Colorado Fuel & Iron Co.
David J. Champion, Champion Rivet Co., Cleveland.
J. W. Powell, Bethlehem Shipbuilding Corporation, Bethlehem, Pa.
A. H. Kellogg, Seattle Chain Co., Seattle.
A. J. Richie, Pacific Steel & Boiler Co., Tacoma, Wash.
J. C. Watson and Frank S. Slocum, Jones & Laughlin Steel Co., Pittsburgh.

Declaration of Policy Adopted by Convention

FOLLOWING is the declaration of policy adopted by the convention:

"The Seventh National Foreign National Trade Convention was composed of upward of 2500 delegates from every part of the United States and many foreign nations. It assembled in San Francisco from May 12 to 15, 1920, to consider the problems of foreign trade arising from the present position of the United States as a creditor nation. As the authoritative voice of the foreign commerce of the nation it presents its final declaration on questions of vital importance to the future prosperity of our country, and commends to the careful consideration of the Government and people of the country its opinion and recommendations.

"The United States as a creditor nation should afford to other nations every favor open to sell their products to us, especially of raw material, without detriment to existing industries; (a) to permit of the liquidation of the obligations of the debtor nations; (b) promote exchange of products in view of the impossibility of their making payments in gold; (c) provide return cargoes for our merchant marine, and (d) to revive industry and exchange in Europe.

Encourage Manufacturers

"Every proper measure should be provided to encourage our manufacturers and producers to exercise the full employment of all their facilities, (a) to satisfy home demand, and (b) to provide a surplus for foreign consumption, for the occupation of our merchant marine and for the provisioning of supplies to foreign nations, more than ever dependent on us under present conditions for articles of necessity and for materials to rehabilitate their depleted stocks and war-worn industries.

"As collateral influences in this program of expansion of exports and imports, it is important (a) that interest of producers should be regarded and maintained on a fair and equitable basis, (b) that production should be increased to the maximum in order to restore normal conditions of employment and living, (c) that our banking institutions should be afforded every reasonable opportunity and protection in their efforts to expand their service to foreign commerce and in enlisting the interest of American investors in foreign securities, with united action to this end, if possible, by exporter, banker, manufacturers and other producers of this country; (d) that a center of American merchandising houses should be established abroad, that would sell our goods, buy foreign goods and create a better trade and financial situation.

Webb-Pomerene Organizations

"Many associations have been formed under the Webb-Pomerene act, resulting in expansion of American exports. As time goes on supplemental legislation may be necessary to further develop opening of trade.

"The Government should maintain as a principle of foreign policy that American enterprise abroad is entitled to the same measure of protection in the Government country where domiciled that foreign enterprises domiciled in the United States receive from this Government.

"Our merchant marine should revert as a practicable entirety to private ownership and operation as contemplated by the act creating a shipping board. We urge that legislation be passed promptly providing for the sale of Government owned tonnage on terms uniform to all buyers having regard to the current cost of building vessels of similar type and tonnage in American shipyards. Unsold ships should be chartered at current market rates for world tonnage without restriction as to trade routes.

"Owing to the insufficient number of passenger vessels in the transportation and South American trade, measures should be taken to relieve the situation by promptly utilizing available passenger vessels in their trades.

American Navigation System

"The investigation of the American navigation system which the Shipping Board was directed by its organic act to effect should be completed without delay and ship revision and improvement made as will enable the operation of the American merchant marine on a fair competitive basis.

"Shipbuilding has become a great industry and we should build for the world's markets as well as for our own requirements. American ships were once among the largest of our exports and there is no reason why they should not be so again. We sell locomotives and freight cars and other manufactured products in all the markets of the world.

"A steamship is a commodity of commerce like any other product of the mechanical art and labor should

be employed in the building of ships for export as well as in the production of shipbuilding materials for export.

"The State and Federal Governments are urged to take steps to remove those disabilities caused by non-uniformity of State laws and excessive taxation which place American insurance companies at a disadvantage with the foreign insurance markets with which they must necessarily compete.

Equality of Treatment

"The vast market which the United States offer to other nations on a basis of equality, the supplies of American raw materials exported without taxation or discrimination and the large tonnage available in our ports to foreign shipping on equal terms with our own entitle American export and import trade to equality of treatment in all foreign markets. To insure equality of treatment the American tariff, whatever the underlying principles, should provide for additional duties on imports from nations discriminating by tariff or administrative practices against the trade of the United States.

"For the non-partisan and scientific ascertainment of the effect upon our commerce of the world-wide readjustment of commercial treaties, revision of tariffs and erection of new preferences and discrimination, the appropriations of the maintenance of the United States tariff commission should be increased and its investigations supported by Congress and the business public.

"Efficient rail and inland waterway transportation is no less a part of export and import trade than ocean shipping. Sound public policy supporting private operation of the railways is imperative. Continued development of inland waterways is necessary to the perfection of economic trade routes.

Intolerable Conditions

"Conditions of communication with foreign countries are intolerable. The delays in foreign cables and mails hamper commerce and greatly increase the cost and risk of doing business. Additional cable facilities and the extension of the wireless telegraph are imperative.

"The expansion of our foreign trade can be greatly facilitated by the further establishment of American Chambers of Commerce abroad, and of the foreign trade sections of domestic commerce organizations. Effective assistance already has been afforded by these instrumentalities in promoting reciprocal trade relations, commercial arbitration and adherence by their nations to the best trade practices.

"The establishment of foreign trade zones at the principal American ports, where products from all countries can be assembled, classified, manufactured and reshipped, will be of great assistance in developing full cargoes, and both ways, so essential to the success of the new American merchant marine.

"The activity of the Post Office Department in extending international parcel post facilities for the United States is highly commended. It is hoped this activity will be continued until the service has been established with all nations and colonies.

"The State Department should have adequate and competent representation in all lands and especially in those new nations sprung up in the reorganization following the war. Its representatives should be properly compensated and housed and equipped with the means for efficient service.

Competent Men Needed

"Legislation should be enacted establishing both the diplomatic and the consular service on a basis which will attract competent and ambitious young men into our foreign service as a permanent vocation.

"The commercial attache and trade service of the Bureau of Foreign and Domestic Commerce should be materially expanded and placed upon a permanent basis with an adequate scale of compensation. There should be a reorganization of the foreign service for the Government as will eliminate any duplication of efforts and enable it continuously to do that effective work essential to the fullest development of our foreign trade.

"Only in such measure as we equip our business agents and other representatives with accurate knowledge of foreign markets with practical knowledge of foreign languages and with a wide knowledge of the economic, social and political conditions prevailing among the peoples of other lands may we expect them effectively to represent us in official life, or successfully promote the expansion of our commerce.

Scientific Preparation

"The trade convention, therefore, emphasizes the need of scientific educational preparations for overseas commerce by which the youth of the land may be fitted to cope with and solve intelligently the problems growing out of our increased participation in international affairs. Such training is an essential and fundamental factor in any foreign trade policy.

American Companies in China

"American companies in China must operate under American laws owing to extra territorial treaties with China. The present American laws do not give our corporations the same opportunity as corporations of other nations with which we must compete for trade in China. Under the Hong Kong ordinances, our British competitors operate as China companies without income tax. American companies which have organized under the Hong Kong ordinances are compelled by recent British order in council to replace American directors and executives by British. Bills now pending in Congress, if enacted, will permit ship companies to return to the protection of the American flag and will encourage the formation of new American enterprises in China for further development of foreign trade. These bills provide for Federal incorporation and will enable American companies to compete with the corporations of other nationalities on even terms with respect to taxation.

"A treaty of peace safeguarding every fundamental principle of the Government of the United States and protecting the representatives of American citizens should be effective without delay."

Metric System Condemned

In addition to the recent order of Secretary of War Baker directing the discontinuance of the use of the metric system, the Navy Department also, through prominent officers, expresses its opposition to that system.

Admiral Griffin, chief of the Bureau of Steam Engineering, in an interview said "that to make a change to the metric system in the Navy would cause havoc with repair work and that he had no idea Congress would be ready to make the large appropriation required to meet the cost of a change."

Admiral McGowan, at the head of the Division of Supplies, points out the serious burden which a change would place on his department.

The commandant and superintendent of the Naval Gun Factory, Washington, says, "It is not believed the time is ripe for the adoption of the metric system."

A dispatch from Paris states that exportations of iron ore from Lorraine to Germany during 1919 amounted to 1,147,947 tons according to a statement by the Minister of Public Works. The imports of coke into Lorraine from Germany amounted to 1,382,845 tons, and of coal 342,498 tons. These figures do not include the deliveries of coal and coke made in accordance with the application of the peace treaty.

The American Institute of Weights and Measures, 115 Broadway, New York, is issuing a quarterly bulletin to keep members and friends in touch with the events and opinions pertinent to the metric legislation issue.

The next national convention of the Society of Industrial Engineers will be held Nov. 10, 11 and 12, 1920, in the Carnegie Music Hall, Pittsburgh, the major subject being "Industrial Education."

AUSTRALIAN TARIFF

How It Aims to Build Up Industries—Effect on American Trade

SYDNEY, April 14.—A closer examination of the new Australian tariff shows how it is designed to build up fresh Australian industries, and how American exports to this country will be hit in the process.

Some novel principles govern the tariff. There is: (1) An intermediate scale of duties, as distinct from the duties levied on British goods and those from other sources, to come into force in the event of Australia making reciprocal arrangements with other countries for granting concessions in duties in return for other concessions. (2) A deferred scale of duties to come into operation at a date coincident with the establishment of certain new industries in Australia. (3) Provision for increased imposts on goods regarded as having been dumped or having been carried by specially subsidized vessels, or at ballast rates. Substantial preferences are given to Great Britain, and the self-governing British Dominions may share in these by reciprocal arrangement. The bulk of the duties operate immediately, but some will not be in force until 1921 and others in 1922 and 1923.

Reciprocal Relations

In regard to reciprocal relations with countries not British the only basis of negotiation can be the intermediate tariff. In entering into negotiations the minister is precluded from offering the British-Empire rate and must confine himself to the intermediate tariff.

The minister has been in touch with British and American interests desirous of opening big engineering works in Australia, provided adequate tariff protection is guaranteed. On this point he said: "There is at the present moment very strong evidence of a desire on the part of big enterprises in Britain and elsewhere to establish industries in Australia. In some cases a plant which was employed in war operations can no longer be usefully engaged, and unique opportunities now present themselves to obtain for the Commonwealth not only the outlay of a vast amount of money, but also the ripe experience and business enterprise of firms of world-wide renown. We can induce these firms to come here. They are willing to come if we will give them what they consider a fair deal. No one knows better than they do what will be the methods of those who are likely to be their competitors in trying to crush them out. I have reason to believe that these proposals will lead to the establishment of industries of the greatest importance to Australia, attract a large amount of capital, and pave the way for others of similar importance."

On a Permanent Basis

Massey Greene believes that, as a result of the new duties, it will be found practicable to establish the iron and steel industry on a permanent basis. "As things become normal," he said, "there will be the fiercest possible competition in the sale of iron and steel products. No other industry has been organized to a greater extent than the steel industry. In America the Steel Corporation has a capital of £369,000,000; and, if necessary, it could swamp this country with its products, giving them away for nothing without feeling the loss. When President McKinley proposed to establish the tin plate industry in America, Gladstone laughed his proposals to scorn, saying that McKinley had as much chance of establishing that industry in America, under a protective duty, in competition with Great Britain, as he had of making the American people wealthy by growing pineapples in hothouses. But we know what happened; and what has not the world owed during the past five years to the fact that McKinley was right and Gladstone wrong? There may come an occasion when the world will be glad that Australia learned its lesson in time. There have been extensive developments in the iron and steel industry of this country during the war. At Newcastle, the Broken Hill Proprietary Co. now has invested, in plant and machinery, a capital of £3,194,000—a very good beginning, though a small thing compared with the capital of the American combine of £369,000,000. One or two very large engineering firms in Great Britain are awaiting the opportunity to establish works here, and the Queensland Government is about to erect iron and steel works at a proposed initial outlay of £3,000,000.

In the past, shipments of iron and steel to Australia have been made in ballast. The new tariff act makes provision for dealing with ballast freights. If by means of subsidized freights the effectiveness of the tariff is reduced, certain duties will be added to the general rates to nullify the subsidies. The act also contains a provision which authorizes an addition to the ordinary duty payable, of an amount equal to the difference between the fair market value of the same article when sold for home consumption in the usual and ordinary course of trade and free on board in the country whence and at the time it was exported to Australia, and the dumped price, except in cases where the difference amounts to 5 per cent or less.

The minister emphasized strongly the disability which Australia suffered from during the war due to its incapacity to produce tin plate. "Australia," he said, "lost opportunities for placing contracts for millions of pounds worth of canned meat simply because we had not the tin plate here, and could not get it. We had neglected to provide the iron and steel plants, and had neglected to build up this industry, not because we did not have the tin—we have it in abundance, nor because we did not have the iron—we have the iron here—but because we lacked the machinery to make use of the raw material we have in such abundance within our borders for the manufacture of tin plate."

American Trade with Brazil

WASHINGTON, May 18.—Progress made by American steel manufacturers in invading markets in Brazil formerly dominated by European countries is described by W. W. Ewing, Trade Commissioner of the Bureau of Foreign and Domestic Commerce, in a report on construction materials and machinery in Brazil.

Mr. Ewing points out that in 1913 the United States supplied only 14.58 per cent of the imports of iron and steel products into Brazil, Germany at that time supplying 25.9 per cent, the United Kingdom 20.26 per cent, and other countries 39.26 per cent. Germany being forced out of the market by the war, the United States in 1917 supplied 91.8 per cent of iron and steel imports into Brazil, while the United Kingdom dropped to 4.45 per cent.

"American steel products are very acceptable in the Brazilian markets," says Mr. Ewing. "There is, of course, the difference between American standard gages and those supplied by continental manufacturers. This is particularly true of the Sao Paulo market, where Paris gages are used extensively. Generally the local market at Sao Paulo does not require extra quality. Specifications for soft steel, with very soft material specified in some cases, are found. Many of the railways are using European standard specifications, or preferably those of the American Society for Testing Materials. When it is properly explained to them that our raw materials and the scrap used in the United States are quite different from those used by continental manufacturers, and that therefore American chemical and physical specifications are likely to be correspondingly different, they are willing to accept our substitutions. It should be noted that Continental railway buyers during the last few years have also accepted American standard specifications when purchasing in the United States.

"There is a very good market for pig iron, which has heretofore been imported almost exclusively from Great Britain. Beginning with the year 1917, no pig iron was received from Europe, and the total imports by Brazil in that year, amounting to 791 tons, came from the United States. In 1912, 3013 tons were imported, and in 1913, 7965 tons, all coming from the United Kingdom. In 1914 the United States furnished 5.6 per cent of the imports, none in 1915, and 48.83 per cent in 1916."

Conclusions as to Shop Committee Plans*

Greatest Question Is, How Far Is Shop Representation to Go?—New Movement Not a Panacea, but Has Already Accomplished Much and Has Come to Stay

BY CHARLES MORRIS MILLS

THE greatest question in the whole shop committee problem is: How far is shop representation to go? Are there boundaries? Are there limits of the spirit of industrial democracy as shown in the shop committee system?

The predominant tendency of management which decides to induct the shop committee system is *to go too far too quickly.* Employers seem to be too zealous to accomplish too much in the shortest time possible. They forget that the underlying process is an educative one, that results come after long, diligent effort, and that the benefits that count the most cost the most.

On the employees' side, too, representatives have sought to take over too much too quickly. Demands have been made that are revolutionary in character, the granting of which would bring grave results, not only upon the management but also upon the very persons who make the demands.

The consequence is that shop committees, not confining themselves to pertinent subjects, have died premature deaths. The employer then says that his workmen are an irresponsible and ignorant lot of dummies, and sinks back into autocracy. The employee, also, says that the whole business is "bunk" and seeks solace in the union or some more radical organization. We come to the conclusion, then, that there must be safeguards for shop representation; safeguards that will seek to limit extravagance of expression or attempts to perform an industrial resurrection too quickly. Where are the protections of shop representation?

Its Proper Field

(1) *Shop representation can exist only in its proper field of activity.* It should confine itself to certain purposes and none other. Shop committees should limit themselves for a long time after their period of induction, to problems of *employment rather than general management.* Differentiation should be drawn between questions that are managerial in character and those which affect directly the worker and his surroundings. Keenness of interest by the workers will be sustained only when questions are discussed which involve them immediately or in benefits that are shown to be in their interest. Confront the workers with a great maze of intricate problems of finance, sales, production, or management, and they become confused. They have neither the inclination nor understanding to become interested in them. When shop committees stick to the realm of the worker and his problems, interest is sustained and quickened; impose the problems of management and the worker becomes disgusted.

Thorough Investigation

(2) *The investigation by shop councils of the details of employment problems should be absolutely thorough.* All the facts should be laid on the table. Anything less than the whole truth will breed only misunderstanding. If a problem of increase in wages is brought before the joint council, it may be necessary to delve into the financial situation of the company. Ledgers and records of accounts may have to be brought in—but what of it?—is not frankness and sincerity better than "bluff" and "bunk"?

The council should have the right to approach the executive heads of the company on all pertinent subjects. Article XI, Section 3 of the Yale & Towne Industrial Council plan reads: "The council may confer with the vice-president and general manager or other official designated by him in regard to all matters of mutual interest, and shall receive from the management regular reports in regard to accident prevention, sanitation, restaurants, medical service, employment, educational programs and recreational activities, including information as to their cost, efficiency and results obtained."

Executives should be free to discuss all such problems as outlined above with their councils. Shop committees will live only where the administrative heads are willing to allow the open door policy with the council.

May Gradually Broaden

(3) *In time, perhaps after a period of apprenticeship, the shop committee may gradually broaden the scope of its policy.* When both parties see that certain discussions in wider fields of production and finance are of benefit to both management and men, then, and then only, should such discussion be allowed. The educational process of the shop committee is slow; it takes time to let ideas sink into the minds of men less skilfully trained than the executives. The shop committee in time will extend its boundaries to unknown limits, but only after a period of probation and thorough trial. As a student in the Trade Union college in Boston writes of the expansion of the shop committee: "Any paper plan, if it is to become a living organism, would better start in an agreement for joint action only with such matters as belong to the individual part of business management; for instance, hours of labor, working conditions, promotions and discharge, bettering production methods, training for apprentices and learners, lessening labor turn-over, minimum rates of pay, sanitation, and such other matters along the production line. * * * Then, if by experience, joint action clears away some natural suspicions and doubts and leads to further good will, the functions under the plan may be extended so as to include any form of co-operation and copartnership that may suggest themselves as feasible and workable. These, however, should be undertaken with extreme caution. For from the beginning in regard to any proposition or suggestion the attitude must be: Is this likely to work out for the benefit of both of us? Since if it advantages one and not the other, it hurts both."

Shop Committee Checked

(4) For the present, then, the shop committee, in its last analysis, is checked by certain boundaries: it must confine itself to questions of employment rather than general management. This check is held by the management in order not only to safeguard their own interests but all the interests involved. The shop committee is still in its infancy, in the cradle of limited representative government, with the power of control largely in the hands of the vested interests. The *esprit de corps* of the shop committee still depends upon the good will, the sincerity, and attitude of the executive interests. Its life rests a good deal upon the goodness or badness of the despot at the head of the controlling power. In that connection it is well to remind ourselves of what John Stuart Mill says concerning good despotism: "A good despotism means a government in which—so far as depends on the despot—there is no positive oppression by officers of state, in which all the collective interests of the people are managed for them, all the thinking that has relation to collective interests done for them, and in which their minds are formed by, and consent to, this abdication of their own energies."—(Representative Government, p. 49.)

Is this restriction of joint control good or evil for

*Continued from issue of April 29.

the shop committee in its present stage of development? Are there checks necessary on the ultimate end of representative democracy in industry similar to checks in political democracy?

Briefly stated, check must come on the power of the shop committee as it exists to-day. Shop committees cannot accomplish everything in a moment. *Ultimate control and ultimate responsibility must lie upon the management with our present system of organized capital.* The executives are charged with certain responsibilities by means of the power given to them by the shareholders; they would betray the trust that has been imposed in them if they would allow shop committees to take control over the ways and means of the control of production. The management cannot waver from its well-defined functions unless the charge given them by the shareholders would permit such a revolutionary change.

There is no question that the ultimate form of the shop committee has got to be a balanced scheme of equal power resting upon management and men, and that ultimate power of control will lie not only upon the president or the general manager but upon the joint council backed up by the will of the investors. The investing public, then, have the final control of the future development of the shop committee. When this group really comes to understand what representation in industry means, then the more ideally formed shop committee will arise.

Limitations of Various Plans

In the present stage of development of the shop committee, the constitutions of many plans provide constitutional checks on ultimate sovereignty, and has been shown, necessarily so. We find the following checks in the various plans.

First.—The management has the *power of execution* of the various policies decided upon. Article 11, Section 4 of the International Harvester plan reads: "The works council shall be concerned solely with the shaping of the policies of the company relating to matters heretofore mentioned. When the policy of the company as to any of these matters has been settled, its execution shall rest with the management, but the manner of that execution may at any time be a subject for the consideration of the works council." The Bridgeport plan reads: "None of the provisions of this plan are to be construed as curtailing the authority or lessening the responsibilities of any executive or committee of executives of the organization (employees' committee) or of the officers or board of directors of the company."

Second.—The management has the power of *veto.* Employee associations may initiate a ruling which, approved by the council, may be carried to the executives. The executives have the power of veto in the matter. Filene's Store (Boston), provides for a two-thirds vote of the employees to supersede this veto. Instances are rare, however, of a subject being passed over a managerial veto.

Third.—The *ultimate power* vested in the president of the corporation is often the deciding factor. He is the ultimate authority on decisions arising from a tie vote of the council; he has the power to call special meetings of the works council; he decides matters necessary for outside arbitration. In many cases the president is the final judge on differences arising out of grievances, suspensions, or dismissals. Part 3, Sec. 12 of the Colorado Fuel & Iron plan reads: "Should the president's industrial representative fail to satisfactorily conciliate any difference with respect to any grievance, suspension, or dismissal, the aggrieved employee, either himself or through his representative—and in either case in person or by letter—may appeal for consideration and adjustment of his grievance to the manager, general manager, or the president of the company in consecutive order."

Fourth.—The maintenance of shop discipline remains in the hands of the management. The sustaining of the proper shop morale is upheld by the constitutional proviso that "the right to hire and suspend or discharge men shall be limited, except as expressly stated herein." Many companies after the above statement generally make a list of offenses which are subject to immediate discharge and a further outline of offenses, less serious than the former, which require caution for the first offense, and dismissal if the caution is not heeded. The General Electric Co. plan (Lynn, Mass., works) reads: "The management of the works and the direction of the working forces, including the right to hire, discharge and transfer, is vested exclusively in the company, and except as expressly restricted, this right shall not be abridged by anything contained herein."

Objections to Committees

Objections to shop committees may be stated as follows:

(1) That shop committees are not applicable to industries as a whole. Much criticism has been laid at the door of the shop committee because it may be applicable to one plant but absolutely unadaptable to another plant in the same industry. There is no doubt some truth in the criticism, but we must remember that shop committees are in their infancy and that inter-plant and national organization may yet be worked out. The success of a large corporation like the International Harvester in the introduction of the system in many of its plants shows the possibilities along these lines.

(2) That the shop committee has no power to enforce its decisions. Shop committees can enforce their decisions when the executive power stands back of them and vice versa. This is a question of executive policy.

(3) That shop committees will run away with plants. This objection is best answered by the results obtained where the proper responsibility has been placed upon the employee representatives. Responsibility so invested has resulted in sobriety of judgment and decision.

(4) That there is no definite place of responsibility in the shop committee. This objection is overcome where the definite functions are outlined. Committee action is legislative; the authority and execution of the legislation lies with the executive group.

(5) That shop committees can be abolished too easily by the management or a change in corporate control. A constitutional clause should cover this objection such as Article 16 of the Yale & Towne plan: "This plan may be terminated after six months' notice, by a majority vote of the employees of the works, or by action of the board of directors of the company."

Results Obtained by Shop Committees

The chief benefits of shop committees are as follows:

(1) *Co-operation.*

There is no question that shop committees have brought a new spirit within the plant. The universal testimony of both management and men bears witness to a new *esprit de corps,* a broader perspective, the elimination of friction and misunderstanding. In this respect, the success of the movement lies not in the letter but in the spirit. Cyrus F. McCormick of the International Harvester Co. said recently: "It is not the plan so much as the way worked that counts." It is the morale of the shop, not the method of procedure, that makes the shop committee plan worth while.

(2) *Re-establishment of personal relations.*

Shop committees are responsible for the re-entrance of personality into industry. In the days of the small shop or factory, preceding the tremendous centralization of modern business, the personality of the executive counted for much. During recent years the personal touch of the administrator has been lost among the men in the shop. To-day it is coming back under the chaperonage of the shop committee.

(3) *Establishment of a definite company policy.*

Through the shop committee the executive is able to establish a definite policy. The employee representative comes to know something of the ambitions, trials, failures and successes of company policy.

(4) *Expression.*

Shop representation allows expression among man-

agement and men. It gives the management a chance to sell its ideas rather than issue orders to men. It gives a chance for workmen to learn to express themselves, to develop executive ability, to become leaders in the shop. It allows for channels of suggestion to be opened, and for valuable ideas to come from the workman.

(5) *Fair-mindedness.*

The policy of the square deal through shop representation results in fair-minded decisions by the employees.

(6) *Conservatism among the employees.*

Representatives elected are generally men of long service and of conservative nature. The average length of service of representatives elected as members of the executive committee of the Locomobile, Remington Typewriter, Singer Sewing Machine and U. M. C. factories in Bridgeport was seven years and eight months, and that of the chairmen was 13 years.

A result of election of this type of representatives means well-balanced decisions, fair judgment, and a desire to control the ambitions of the unbalanced radicals.

The Yale & Towne Council, at Stamford, Conn., reports that recently a petition from the employees was received by the management asking for authority to oust the radicals from the factory. Among the representatives was an Italian, a Hungarian, a Pole and a Hebrew. We see, then, the possibilities of shop committees as training schools of Americanization.

(7) *Elimination of industrial trouble.*

No figures can show just how shop committees eliminate strikes and other industrial maladjustments. But we can say that they go far to meet incipient and latent discontent. Recently, at the first meeting of a joint works council, the employees presented a petition for hour and wage demands.

They asked for: Reduction of hours from 55 to 44; increase of wages, 35 per cent; time, one and one-half for overtime, double time holidays.

They received: Fifty-hour week, 20 per cent increase in earnings; a weekly payday; time and a half for all overtime.

Result: 161 out of 4300 quit.

This example shows a condition existing before the organization of the shop committee which would have undoubtedly led to a strike, sooner or later; the organization allowed the expression of the demands; it resulted in a compromise that was so satisfactory that only a very small percentage of the force left. It shows the possibilities of adjustment of shop difficulties without strikes.

(8) *Increased comfort of living.*

Shop committees indirectly forward the comfort of living in the elimination of strikes, but also they affect the life of the worker's household and that of the community. Outside agencies can effect an entrance into the shop far better by commendation from employee representatives than by the recommendation of the employer. The Miller Lock Co., Philadelphia, reports that educational classes increased 550 per cent under employee administration after being turned over to them by the employment service department.

Co-operative societies, functioning through shop committees, can bring bettered conditions of living. Local consumers' leagues or co-operative associations, buying wholesale at cost and selling at cost (with margin for overhead and expansion), effect great savings. A factory in Connecticut installed a co-operative association last year. Although employing less than 1000, it did a business per annum of $275,000 and has brought a saving of from 15 to 18 per cent to its members.

Possibilities along these lines are, as yet, almost untouched, and there seems to be no limit to expansion.

Conclusions

On the whole we may draw several general conclusions upon the aims and tendencies of American shop committee development:

(1) *Shop committees are not a panacea.*

Shop committees do not seek to cure all the diseases of our industrial sickness, but, however we may regard them, we cannot help agreeing that they are *surely better than nothing.* They cannot be applied, in their present form, wholesale to any industry, but rather must be adjusted to the individual plant. There are, undoubtedly, a few plants, employing small groups, where, due to admirable industrial relationship along other lines, their establishment is of small benefit. But for the great rank and file of American industries, both organized and unorganized as to union affiliations, shop committee organization brings astonishingly far-reaching results.

(2) *Shop committees are here to stay.*

Shop committees are not a flash in the pan or a "hand down" from the indulgent capitalist. Gradually they are forming more and more an integral part of American industrialism. They breathe too much of the spirit of the age to be sneered at or disregarded.

(3) *Shop committees are in the cradle period.*

Shop committee development is the early stage of evolution. Its form is constantly changing and will continue to do so. It is not the form of organization but the underlying spirit that counts to-day.

(4) *Shop committees have distinct functions.*

Shop committees have certain functions to perform, different from any other existing institution or organization. Because of this very fact, they are being accepted as an integral part of our industrial fabric. They are succeeding because they have been placed in a field where there was no competition. They seek to educate rather than bargain. The great weakness of trade unionism is that it had not enough foresight to choose this field of functioning and by its very nature cannot cover the distinctive function of the shop committee.

(5) *Shop committees at present are controlled by the management.*

Political democracy for its own self-protection has ultimate restrictions. The President of the United States has the power of veto; our representatives restrict in part the passions of the people; our courts curb a radicalism which seeks to undermine the institutions of government.

Industrial democracy, too, for self-preservation must have ultimate restrictions. Shop committees, as an expression of the spirit of industrial democracy, must be a balance of power. We cannot turn the reins of power over to the worker and not expect an autocracy of labor. The shop committee seeks a *via media*, a course by which both management and men may learn to live together. From the very make-up of our business structure, executives charged with power by an investing public cannot forsake their responsibilities. For the very sake, then, of preserving the purpose of shop representation, management for the present must have the balance of power.

(6) *The benefits of shop committees far outweigh their weaknesses.*

Shop committees, for the short period of their existence, have accomplished much. There have been failures, there have been half successes. But as an institution, weak, struggling, imperfect in form, the shop committee has shown us a line of approach. They portend much for the future. They lead us into the heart of the industrial problem: no longer are workers mere "hands," but individuals; no longer are items on a payroll figures, but men.

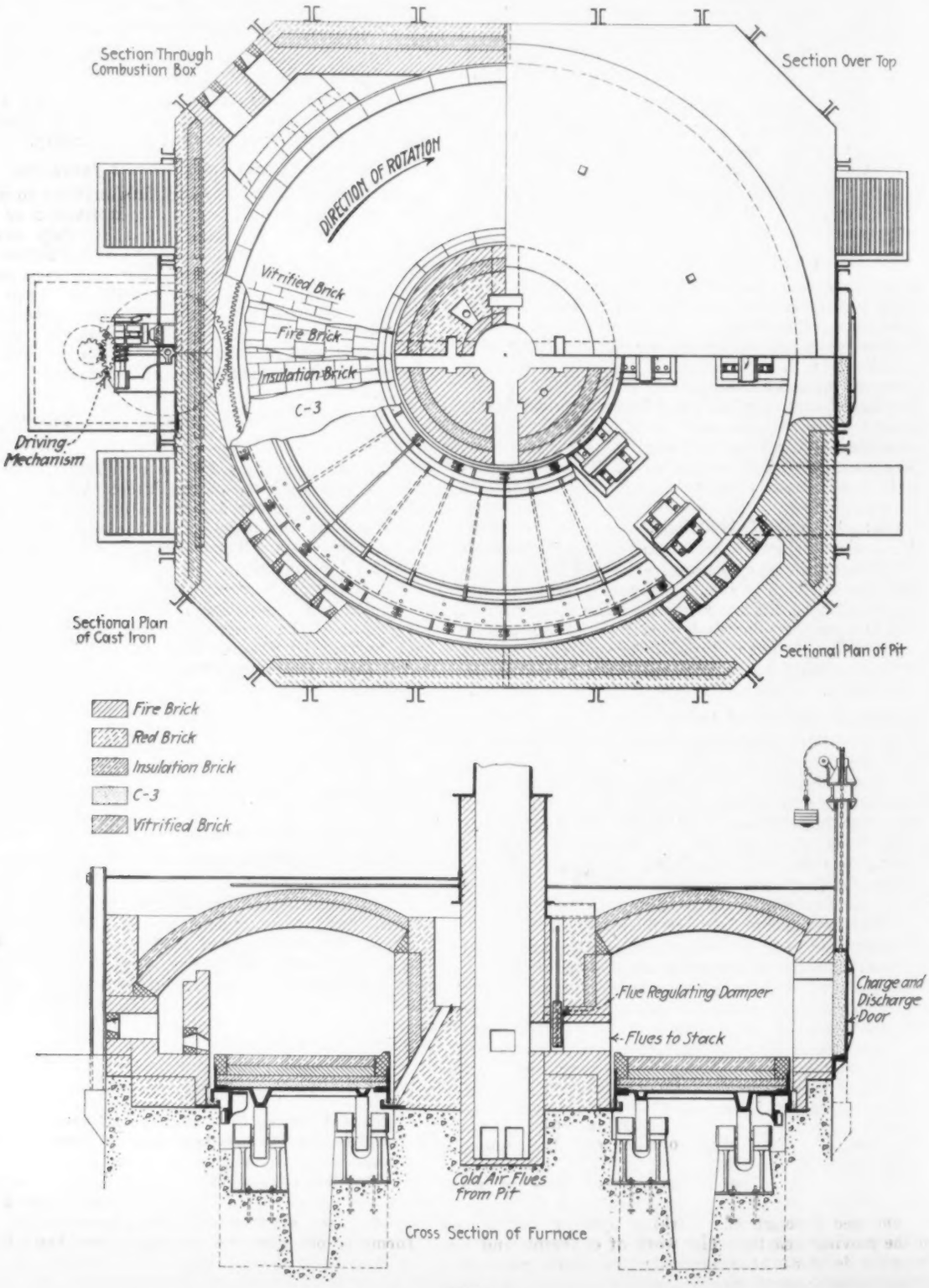
Norton Bros., Baymiller street, Cincinnati, dealers in machine tools and power plant equipment, have effected a consolidation with the Broadway Machine Tool Co., that city, and in future the business will be run under the name of the Norton-Broadway Machinery Co. H. C. Jones, formerly at the head of the Broadway company, has severed his connection, and will, it is understood, organize a company to go into the manufacturing end of the business.

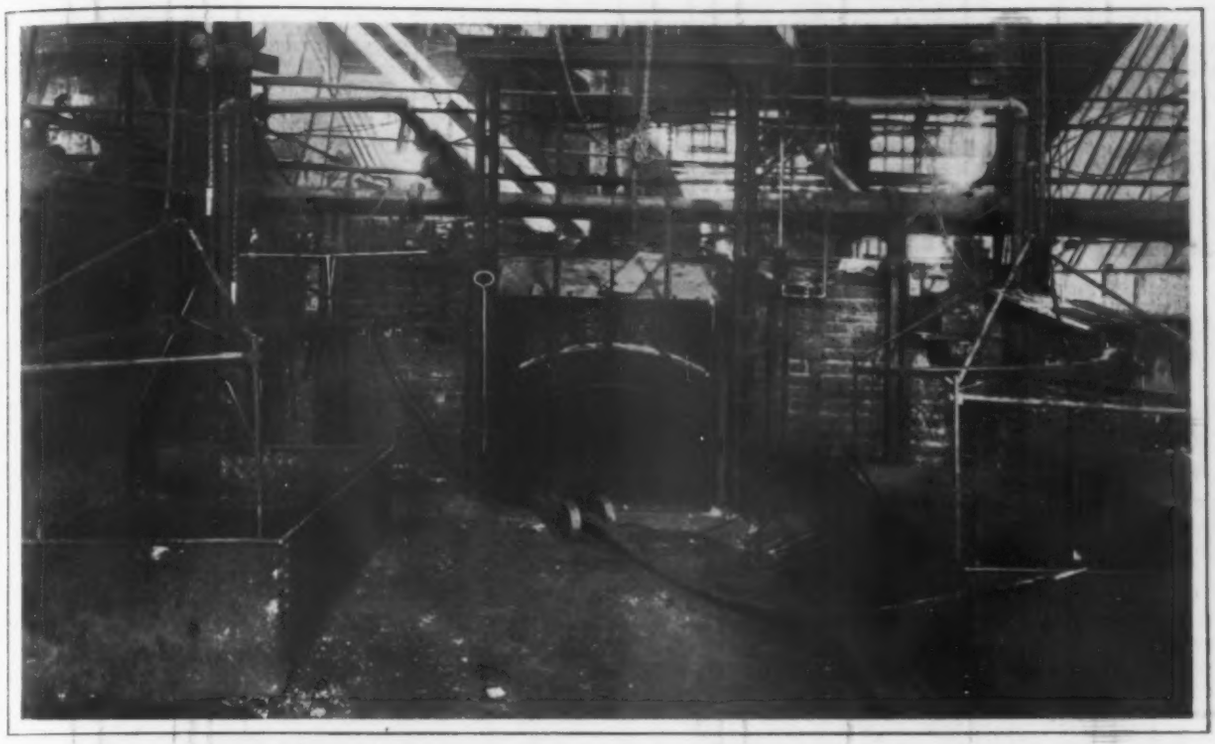
Rotary Oil-Fired Furnace of New Design

Motor Driven Hearth Makes One Revolution in Time Required for Carburizing—Operation is Continuous—Fuel Consumption and Tonnage Results

A NEW design of rotary hearth-type oil-fired furnace has recently been placed on the market by Tate-Jones & Co., Inc., furnace engineers, Pittsburgh. An installation of this new type of furnace has been made in a large tube manufacturing plant in the east and, it is stated, has been giving satisfactory results. Although the main principle of construction has been used in some oil-fired furnaces now in operation, the design of this particular installation is new.

The revolving carriage or hearth is 16 ft. 6 in. outside diameter and 6 ft. 6 in. inside, having a width of 5 ft. and revolves on wheels set in the foundation. The furnace is 19 ft. over all. Burners at the four corners fire into combustion chambers and the heat is led from these so as to be evenly distributed over the hearth, and finally is vented to the center and is car-

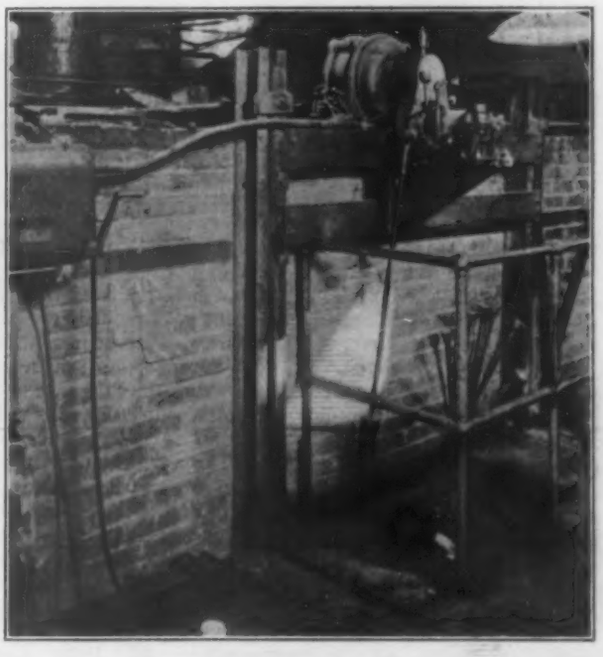




Front View of the Furnace with the Charging Opening Closed. The type of truck used for rolling the pots into the furnace and upon the moving hearth is shown, also the quenching tanks in which the gears are placed after being removed from the boxes

The illustration at the left shows the two burners in one of the combustion chambers

Below is shown the driving motor and crank mechanism that drives the ratchet which is underneath the floor level



ried out of the building by a stack. Power to drive the hearth is derived from an electric motor which is geared down so that the hearth makes one complete revolution in eight hours or whatever period of time is required for carburizing. This gearing is so devised that the time of revolution can be regulated varying from 6 to 12 hr. in steps of 15 min.

The material to be carbonized is placed in boxes with suitable carbonizing compound, and these boxes are charged through the working opening and placed on the moving hearth. The work of charging and discharging is done at practically the same time, and approximately every 20 min., which is about the time required for the hearth to move a distance sufficient to allow pots to be removed and other pots to be charged. This makes a continuous operation, and readily solves the problem that many have been working on, of having a continuous furnace with no metal parts exposed to the heat and of treating parts that cannot be readily pushed or rolled over the hearth.

The furnace occupies a space of only 19 ft. square, has a hearth area of 180 sq. ft., and is doing the work of 10 of the old type underfired furnaces, five of which formerly occupied the same space and had a hearth area of 20½ sq. ft. each. This gives an increase of production of 100 per cent in floor space and 147 per cent in

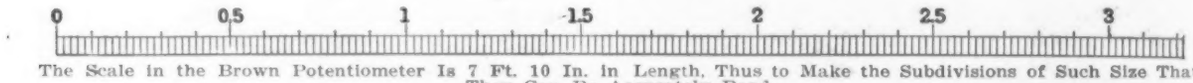
hearth area. Under the old conditions it required nine men in a shift to operate 10 furnaces, while five men easily handle the continuous furnace. With additional rotary furnaces much greater labor saving can be accomplished, as the men can work steadily all of the time on loading and unloading, whereas with the batch type furnace the work comes only at intervals with the men idle in the meantime. When running at capacity the furnace will hold 85 of the pots described, which are 18 in. in diameter and weigh 150 lb. each. The weight of the charge is 105 lb. per pot, giving a total weight for the pot of 255 lb. and total weight of charge, 21,675 lb. The time of one revolution is 8 hr., so that three heats a day are taken from the furnace, or a total weight of 65,025 lb., and total product, 25,500 lb. As the furnace operates on 22 gal. of oil per hr., it means a consumption of 16 gal. per ton of material. The old furnace consumed 2½ gal. of oil per hr. and produced one ton of material in 8 hr., or a fuel consumption of 20 gal. per ton. This shows a fuel saving of 20 per cent for the rotary furnace.

In summary, it shows a 100 per cent increase of production in floor space; 45 per cent saving in labor; 20 per cent saving in fuel. This type of furnace is adaptable to many types of work other than carburizing, and should be of interest to firms producing work in quantity, where continuous operation would be of benefit.

Characteristics of Pyrometric Potentiometers

Design of the Brown Instrument—Effect of Scale Length on Accuracy—The Unsaturated Standard Cell

THE potentiometer in pyrometry is the subject of an interesting monograph by Charles P. Frey, chief engineer Brown Instrument Co., Philadelphia. After discussing the standards for the ampere and the volt, the theory of operation of the potentiometer and its use for current determinations, Mr. Frey considers the essential characteristics of potentiometers for pyrometry and explains in detail the construction and characteristics of the company's new portable potentiometer. Those portions of the article dealing with potentiometer characteristics in relation to Brown instruments are given largely in full as follows:



The Scale in the Brown Potentiometer Is 7 Ft. 10 In. in Length, Thus to Make the Subdivisions of Such Size That They Can Be Accurately Read

Potentiometers for Pyrometry

In the selection of a potentiometer best adapted to the requirements of pyrometry, consideration should be given to the fact that since it cannot be adjusted and then read as quickly as the indications of a deflection instrument can be observed, there remains only one reason for its employment, which is on the score of greater accuracy. It also should be designed to be convenient for the measurement of electromotive forces which are almost invariably less than 0.05 volt, and should have a scale which is not only extremely accurate in its calibration, but which in addition is long enough, or as it is called, sufficiently "open" to permit small differences in potential to be determined with rapidity and precision. If, for instance, such a scale has a length of only about 10 in. and is calibrated to have a range of 0 to 50 millivolts, one millivolt will have a scale length of about 5 mm. or 1/5 in. Therefore, even if such an instrument is used for measurements near the upper end of the scale, and it is possible to read by interpolation to one-tenth of a scale division, the extreme limit of accuracy, with no allowance for what is called the personal equation or error in observation, will be 1/5 of 1 per cent.

Taking into consideration the fact that a platinum-rhodium standard couple develops only 5.95 millivolts at a temperature of 1200 deg. Fahr., it is evident that such an e.m.f. cannot be read with extreme accuracy on a scale which is too short to be sufficiently subdivided. The scale in the Brown potentiometer overcomes this objection, since it is 7 ft. 10 in. in length. This scale is spiral and is inscribed upon a drum. The drum wire is wound upon a corresponding insulated cylinder mounted on the same axis and rotating with the scale drum.

Principle of Brown Potentiometers

The fundamental principle of this instrument may be understood by reference to Fig. 1, which illustrates the scheme of an ordinary portable potentiometer. A constant current from the plus side of a small dry cell flows continuously through the rheostats R and R^1, the ballast coil J, the slide wire $C\ A\ B$, and the resistor T, back to the cell. The current through this circuit is regulated by means of the rheostats R and R^1 so that the e.m.f. between C and F will equal the e.m.f. of a selected standard cell. When this is the case the e.m.f. of the slide wire $C\ A\ B$ will have a predetermined value in millivolts between its extremes.

By connecting a source of current at E, its e.m.f. can be determined by balancing it against a suitable part of the e.m.f. of the slide wire. When these cylinders are rotated by means of a knob, an index moves across the scale. The motion of this index is synchronised so that the position of a contactor on the slide wire coincides with a corresponding position of the scale index.

The Standard Cell

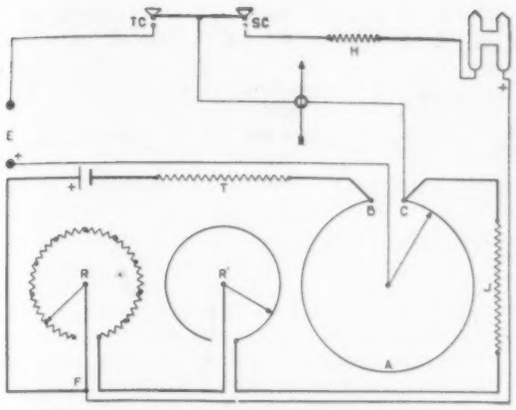
Since the accuracy of these potentiometers depends directly upon the e.m.f. of the standard cell, great care has been given to secure satisfactory ones. The cells conform with the recommendations of the Bureau of Standards and are of the type known as unsaturated. The Weston normal cell, invented by Edward Weston, containing a saturated solution of cadmium sulphate, was adopted by the Bureau of Standards in 1911, as the standard of e.m.f.; E=1.01830 International volts at 20 deg. C.

Saturated cells, if extreme precautions are adopted in their construction, can be produced from different materials and agree within a few parts in 100,000; but owing to the fact that they have a small temperature coefficient (approximately 0.00006 deg. C.) they are not preferable for practical measurements, independent of temperature variations.

Another cell, also the invention of Mr. Weston, is identical with the normal standard in ingredients except that the solution used is diluted instead of being saturated. The effect of this dilution is to slightly increase the e.m.f. and to reduce the temperature coefficient to practically zero ($\pm$0.00001 deg. C.). The exact e.m.f. of a properly "aged" cell of this type should lie between 1.0184 and 1.0190 volts and its voltage will remain constant within 1/100 per cent for years, provided the cell is not short-circuited or otherwise abused.

The fact that in constructing unsaturated cells the density of the solution affects the e.m.f. gives manufacturers of precision instruments the advantage of employing cells which are alike in e.m.f. and which may be therefore interchanged.

A further advantage lies in the fact that the con-



Wiring Scheme of an Ordinary Portable Potentiometer

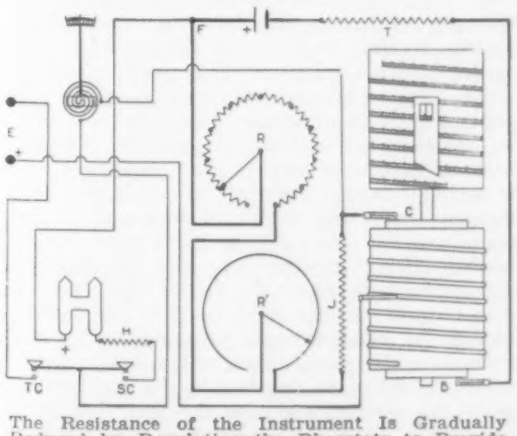
stant e.m.f. of these cells simplifies the construction of potentiometers, since it obviates the necessity of introducing a thermometer and a device to "set" the instrument to correspond with a definite voltage at a known temperature, which is necessary for precision tests if a normal standard cell is used. The cell in this potentiometer is packed in a portable case which includes a resistor of about 3000 ohms, to prevent damage in case of accidental short circuit. This case can be speedily removed if it is considered desirable to have the cell standardized. Meanwhile, a duplicate cell may be substituted, the case of which interchanges with the original, so that only two connecting leads need be secured to binding posts.

A small dry cell is used to furnish current for the main circuit. This cell is called No. 705 Eveready, and can be purchased in electrical supply stores.

The Drum Wire

Nearly all portable potentiometers have a drum wire of low resistance, measuring about 20 ohms. Consequently, to obtain sufficient "drop" or potential difference between its extremes, a comparatively large current is necessary. Therefore, the dry cell which furnishes this current is constantly falling off in e.m.f. due to polarization, and is rapidly exhausted. In addition, the current does not remain steady for any length of time and the rheostat requires constant resetting to keep the instrument in balance.

The Brown potentiometer (Fig. 2) drum wire has a resistance of 140 to 150 ohms, and the total instrument resistance for 50 millivolts is approximately 4175 ohms including the resistance of the rheostats. This is gradually reduced by regulating the rheostats to a minimum of about 3400 ohms, when the dry cell is exhausted and must be renewed. The e.m.f. of the dry



The Resistance of the Instrument Is Gradually Reduced by Regulating the Rheostats to Provide for Exhausting of Dry Cell

cell is from 1.5 to 1.2 volts, according to its condition, and the current required to operate the potentiometer is never more than 0.00036 ampere or about one-tenth of the current required to operate potentiometers of the ordinary portable type. The result is that the dry cell will have a long life (from three to six months according to condition) which is of course an advantage; but what is of far greater importance is the fact that the current drawn from the dry cell is so small that the cell will not polarize and will give a practically constant current, subject only to temperature changes. Consequently the potentiometer, after being balanced against the standard cell, will remain in balance for hours without readjustment. Hence a large number of tests can be made in succession with the absolute certainty that there will be no errors introduced due to change in the potentiometer current.

Sensitivity

The Brown galvanometer has no suspension fibers and the movable coil does not turn with an erratic motion, dance or vibrate. It is positive in its indications as well as aperiodic in action. Its resistance is approximately 150 ohms. The galvanometer has a guaranteed sensitivity of two and eight-tenths megohms (10-6 ampere). This remarkable result is obtained by using tungsten alloy magnets, a concentrated field and a movable system wound with special enamel insulated aluminum wire. The weight of this movable system

Brown Portable Potentiometer. The small current required to operate the instrument makes for long life of the battery and for accuracy for a longer period without readjustment

is so slight that it is unaffected by mechanical jars in transportation, the pivots remaining sharp under all conditions, with no reduction in sensitivity.

The scale may be calibrated to any range up to 1 volt, but the preferred ranges are 25, 50, 75 and 100 millivolts. A double scale will be provided if desired so that the instrument may be read in millivolts and in temperature equivalents. Scales in both Fahrenheit and Centigrade will also be furnished. When the e.m.f. to be determined is over 1 volt, a volt-box is a necessary adjunct.

The development of mechanical cargo handling at marine terminals was the subject of a paper read by James A. Shepard, vice-president and chief engineer Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., at a meeting of the Society of Terminal Engineers, New York. Reprints of the paper are now available for distribution by the Shepard company.

The Blaw-Knox Co., Pittsburgh works at Hoboken, Pa., steel fabricator and manufacturer of steel specialties, also Blaw-Knox forms for road construction, has started the publication of a new house organ which is known as *Blaw-Knox Life*.

The British Iron and Steel Institute

British Blast Furnace Practice Discussed — Electric Power in Steel Plants—Slag Reactions in the Acid and Basic Open-Hearth—Distinguished Metallurgical Chemist New President

(*Special Correspondence*)

LONDON, ENGLAND, May 7.—The annual meeting of the Iron and Steel Institute took place yesterday and to-day at the Institution of Civil Engineers, London, and was attended by an unusual number of members and visitors. Papers of special interest were presented on blast furnace practice, on which it is probable there will be a valuable discussion by correspondence, the time for verbal discussion being rather limited.

The outstanding point brought out by the speakers was the inferior quality of present-day blast furnace coke, of which there have been complaints practically throughout the war. It is evident that far greater attention will have to be paid in the future to this question, as well as to the preliminary treatment of low-grade ores by mechanical cleaning, calcining at the mine, sintering or agglomerating the fines, and other means, especially in view of the developments in the smelting of basic iron.

Features of American practice, which for good and sufficient reasons, have not hitherto been welcomed in Great Britain, are also likely to be regarded more favorably during the coming decade. Fuel and labor problems will call for equipment of a type which has been particularly well developed in the United States, and many mechanical refinements formerly looked upon as luxuries will in future become sheer necessities. British ironmasters are fully alive to the requirements of the time and many of the best features of American and Continental practice, with the requisite modifications to meet local conditions, are being, or have been, incorporated in British plants.

The new president, Dr. J. E. Stead, F.R.S., whose name is familiar wherever scientific metallurgy is known, was inducted into the chair at the first morning session by Dr. Eugène Schneider, the retiring president. The Bessemer Medal for 1920 was awarded to Harry Brearley, Sheffield. Carnegie research scholarships have been awarded as follows:

Dr. J. Newton Friend, £100 to carry out field tests on the corrodibilities of wrought iron, steel, special steels, cast iron and typical non-ferrous metals.

R. M. Keeney, £100 for an investigation on carbon-uranium steels.

T. F. Russell, £100 for an investigation on the constitution of chromium steels.

F. C. Thompson, £100 to enable him to study surface tension effects in metals, especially ferrous.

An innovation was a series of demonstrations by kinematograph and X-rays and a comprehensive series of exhibits covering a wide field of scientific and technologic interest. This followed the annual dinner at the Connaught Rooms. A further innovation will be the holding of an adjourned meeting next week in the Mappin Hall of the University of Sheffield, at which a series of papers of special interest to the Sheffield steel trades will be presented and discussed.

The autumn meeting will be held in Cardiff by invitation of the ironmasters and steel manufacturers of South Wales and Monmouthshire.

"Iron Portland Cement"

E. H. Lewis, introducing his paper, "Iron Portland Cement," exhibited a number of specimens, and observed that the British standard specification for Portland cement was drawn up by people with a strong prejudice against any cements made with slag, and the specification evidently had the object of excluding the use of such cements as far as possible. This prejudice would have to be overcome.

Prof. C. H. Desch said that the processes of manufacture described by the author were of great importance to the blast furnace industry, as they used up a waste product and produced material in great demand. The ordinary Portland cement process was the same whether blast furnace slag was used or not, and the only question that need be considered was the addition of a further 30 per cent of the slag to make the so-called iron Portland cement. Tests on such cement showed considerable increase of strength, and he had for some time advocated the addition of extra material to Portland cement with this object in view. The process was known to the Romans, who added an easily decomposible silicate, such as volcanic rock, which took up free lime and formed a stable monosilicate. If the iron Portland cement industry were to become permanent, however, the greatest care should be taken of the quality of the product to overcome the prejudice against slag cement.

F. W. Harbord stated it was largely a commercial question and agreed with Dr. Desch. It was essential to exercise care in the selection of materials to obtain the required final product. He pointed out that in many cases the raw material for ordinary Portland cement was very cheap, quite as cheap as slag. He then referred to the use of one-third of slag meal (unclinkered slag) in Germany, as an admixture to Portland cement. This gave the same results as the ordinary Portland cement, but was not allowed to be sold as such. The use of two-thirds of slag meal gave a very inferior product. He was personally in favor of following American practice, excluding slag meal altogether, and aiming at a true Portland cement by clinkering the whole of the mixture.

Alfred Hutchinson, Skinningrove, referred to a process used by his father, the late T. C. Hutchinson, for granulating blast furnace slag, about the year 1880, for the manufacture of Portland cement. This particular product had never been beaten as a hydraulic cement. He thought there was a great future for the industry, and that research should be carried out along three main lines: To take the potash out of the slag to a greater extent; to utilize the heat of the slag at the same time so as to leave a first-class material for making Portland cement.

Blast Furnace Papers

The three papers concerned with blast furnace practice were introduced by their respective authors. These were: "British Blast Furnace Practice," by Fred Clements; "Valuation of Ores and Iron Making Material," by C. H. Ridsdale, and "Chemical and Thermal Conditions in Blast Furnace Practice," by H. E. Wright.

Mr. Clements remarked that a common basis of comparison of blast temperatures and pig iron yields was necessary in working out data on blast furnaces. He found that after making the necessary adjustments, the striking things were: The consistency of carbon consumption per square foot of bosh, and the constancy of the rate of making iron per square foot of bosh. The rate of making iron was also proportional to the area of the bosh when the furnace was working well up to output. In referring to the special features of the type of blast furnace proposed in his paper, he emphasized the four-column support for the furnace, which allowed great freedom in the number and spacing of the tuyeres, and also the fact that four downcomers were used, each making a separate connection to the dust-catcher, which construction gave a very even and satisfactory distribution of the flow of gas inside the furnace.

The president in opening the discussion referred to the problem of coke economy in blast furnace practice and said that in spite of all modern technical improvements the coke consumed in the Cleveland district of

Yorkshire to-day was higher than before the introduction of hot blast.

Mr. Wilson, of Redbourne Hill, criticized some of the thermal equations in the papers, and in reference to Mr. Wright's statement regarding the replacement of lime by magnesia, he thought that such replacement actually took place in the correct theoretical proportion.

Henry Crowe asked if Mr. Clements found any difference in the working of blast furnaces blown by turboblowers and reciprocating piston blowers respectively.

Conditions in India

Dr. Andrew McWilliam, Sheffield, said that at the Tata works in India, during the monsoon, the large amount of clay adhering to the ore made a great difference in the coke consumption of the blast furnace, and ore had to be brought in as far as possible during other seasons of the year. This illustrated the points brought out by the authors as regards the composition of the furnace burden. At Sakchi they had also found no need to have more than one per cent of manganese, owing to the low sulphur in the ore. He had always found that there was great discrepancy among blast furnace men in different districts or countries in reference to alumina. Opinions varied from those who strongly claimed it as a base to those who equally strongly claimed it as an acid.

Gerald Parker referred to the effect of the size of hearth on coke consumption, and stated that in the United States, where hearths had been increased up to 20 ft. 9 in., a considerable decrease in coke consumption had followed. The same results had been obtained at Messrs. Cochranes' blast furnaces on a somewhat smaller scale.

George Owen, Manchester, commended the principles of valuation set out by Mr. Ridsdale, and hoped that they would be widely adopted by the industry. In practice, however, it was not necessary to go into quite such intimate detail as Mr. Ridsdale had done every time a valuation had to be made, although it was very useful to do so occasionally. He thought Mr. Wright's physico-chemical phrases were somewhat obscure, and that he had laid far too much stress on the interception of heat by the furnace burden.

Alfred Hutchinson's remarks were read by Mr. Wilson, of Skinningrove. He considered that the complete schedules of blast furnace practice and plants in various districts of the kingdom would afford valuable means of reference for many years to come. He would only deal with one of the many points for discussion which the paper offered, and that was the character of the material charged into the furnace. That was a matter which had always possessed great interest to those at Skinningrove. The author of another paper on blast furnace practice had referred to the paper of their late managing director T. C. Hutchinson, on "The Mechanical Cleaning of Ironstone," in which was proved a great economy in fuel comsumption, resulting from cleaning out silicious impurities in the stone by means of a mechanical picking belt in preference to using the flux and fuel necessary to smelt it out in the blast furnace. It was, however, equally important to deal with all materials charged into the blast furnace as well as with the ores. Blast furnace managers have long been impressed with the importance of using as pure limestone as they can get, and this was largely a question of good native deposits and careful selection of the stone at the quarries, coupled with careful checking by analysis at the works.

It was of equal importance, contended Mr. Hutchinson, to apply the same methods to the coke charged into the blast furnace, and the author would have the sympathy of many blast furnace managers in regretting that the makers of coke should be satisfied with the present condition of things. During war conditions and post-war conditions, coal to be coked at combined blast furnace and coke oven plants, and coke made near collieries, were both sent out with high ash content, affecting most detrimentally the coke consumption of the blast furnaces. Whereas at Skinningrove they could formerly work for many months with an average not exceeding 21 cwt. of hard Durham coke, the coke now has such a high ash content that 25 cwt. has become usual, and many managers could report that the depreciation had been even more serious.

Flotation Process for Washing Fuels

While considering the question of the best modern washer with which to deal with this inferior coke and coal at the blast furnace plant, they had had suggested to them an entirely new method of washing based on the flotation process worked by Minerals Separation, Ltd. In the first instance, by using waste liquors from their own coke ovens, they had been able to remove shales slightly more effectively than by the best of modern washers, and further, by varying the oil and consequently the surface tension produced by the oil, they had been able to obtain by the flotation method a further separation of what is known as the bone coal, leaving a pure coal of exceptional cleanliness, which on being coked separately in a by-product oven, yielded coke of altogether exceptional hardness and quality. They estimated by this process that they would be able to bring their coke burdens to about 21 cwt., the figure at which they stood when they were able to get good hard Durham coke made from clean washed coal.

Ernest Bury's remarks were also presented by Mr. Wilson, Skinningrove. He stated that he was anxious to support Mr. Hutchinson's commendation of the author's thorough paper on blast furnace methods, and the tabulated statements of varying practice in different districts of Great Britain would become a standard table of reference. At Skinningrove they were generally in agreement with the author's main contentions. He had sent out an s. o. s. on the question of blast furnace fuel (incorrectly described as blast furnace coke) which demanded instant attention. The author had stated that complaints of bad coke had been made *ad nauseam* and they at Skinningrove agreed, but now suggested that radical means should be taken to correct the present state of affairs. They suggested, first, that blast furnace fuels, whether coking coal or coke, should be standardized and sold on their intrinsic worth, i. e., their metallurgical value, in the same manner as foreign ores were purchased, and second, that the blast furnace manager should himself undertake the cleaning of his blast furnace materials. In this connection he would refer to the recent experiments at Skinningrove on the washing of coking coal by flotation methods, such as were practised on an extensive scale throughout the world for the recovery of metallurgical fines from waste slimes. These experiments, which had been conducted by Captain Broadbridge and by Butler Jones of Minerals Separation, Ltd., and by the staff at Skinningrove, had indicated that the pure coal substance could be readily separated from bone or bastard coal and shales. The following was a typical example of the separation effected in a Durham coal.

	Percentage by Weight	Ash
Pure coal	77	3.8
Bone or bastard	15	12.0
Shales	8	70.0

They proposed at Skinningrove to make coke from the pure coal substance, giving a coke of from 5 to 5.5 per cent ash. They would put the bone coal to producer, boiler, or Loco use, since in addition to containing considerable quantities of unseparable ash, its agglutinating or coking properties were indifferent. In addition to removing the shales as effected by ordinary coal washing, the colloidal clays were likewise completely separated by the flotation method. These colloidal clays were the substances which held the water in washed small coal and prevented its drainage. By their removal the small washed coal from the flotation process drained extremely well, and they anticipated no difficulty in reducing the water content after flotation washing to below 7 per cent. The effect of removing the bone coal shales and colloidal clays from the coal made a great improvement in the strength of the coal, as was shown in the samples submitted by the speaker.

In view of Mr. Clements' strong comments on the disgraceful cokes now sold for blast furnace work, Mr.

Bury thought members would be interested in what they were doing at Skinningrove to meet the crisis, and they quite anticipated bringing their coke burden down to their old figure of 21 cwt. when this super-cleaning of the coking coal had been put to work.

E. W. Jackson, Saltburn, criticized a number of details in Mr. Ridsdale's paper, and said that apparently carbon monoxide was not of itself able completely to reduce the oxides of iron. He asked if it would be an advantage to introduce into the upper part of a blast furnace considerable quantities of hot water-gas (a mixture of carbon monoxide and hydrogen), which was much more active.

Herbert K. Scott, London, said that the criticism hitherto had been chiefly directed against the coke makers, but he thought that the ore miners should not be left out. He had seen some iron ore being sent out from the Midlands and had wondered how anybody ever expected to get any iron out of it. He was interested in the successful use of sintering processes, and remarked that the green oolitic carbonates of the Midlands would have to be relied on very largely in the future. He would like to know if these green carbonates could be suitably prepared by a simple sintering without other form of calcination, or if the sintering process were only successful with brown ores.

Mr. Clements, in a brief reply, said that he much preferred blast engines of the reciprocating type to turbines, and in reply to Mr. Scott, observed that it was the brown ore and not the green which had sintered and this process had been applied for the treatment of the fine ores only, to render them suitable for charging into the furnace, and not to the ores in bulk.

Direct or Three-Phase Current for Mill Drive

In discussing the paper by C. A. Ablett, "Direct Current Compared with Three-Phase Current for Driving Steel Works Plant," F. P. Clark, Middlesburgh, said he had confirmed most of the author's views by experience in large steel works during the past 16½ years, especially with regard to auxiliary machinery in merchant mills. In such experience 40-hp. 3-phase plant, which was not altogether up to its work, had been successfully replaced by 20-hp. direct current machines which had given every advantage over the old system in spite of their lower power. He thought it would be advantageous if the loss due to conversion in the rotary convertor could be avoided, for then little, if any, 3-phase current would be used in steel works. He agreed that it was not altogether desirable to link up with power supply authorities, as the steel works had a great surplus of power at the week-end which was just the time when the power companies did not want it. It was far better for the works to be self contained in this respect.

Walter Dixon, Glasgow, gave a racy account of the evolution of electrical engineering, with special reference to the habits of certain self-styled electrical engineers. He observed that so many engineers were satisfied if they could only "see the wheels go round," that they often installed unsuitable plant and wasted thousands of pounds. He warned the meeting that the country was going to be flooded with alternating current plant, which was the least suitable for steel works practice, especially where close speed regulation was necessary.

Henry Crowe, Saltburn, as one of the first to drive auxiliary machinery by electricity, agreed with the author's views. As regards linking up, he thought that owners of the works should also be the owners of the power supply company. As regards the power required under the two systems, he instanced the average mill hot saw which worked quite well with 40-hp. direct current motor, but required from 60 to 80 hp. of alternating current to do the same work. In far too many cases alternating current was used in a works simply because it happened to be available. In the matter of speed regulation contactor gear worked far better with direct than with alternating current, while in the operation of auxiliary plant in general the 3-phase system punished the machines far more than the direct current, especially in the case of cranes.

Lt. Col. D. Selby-Bigge, Glasgow, referring to the transmission of power, agreed with other speakers that the ordinary direct current was not suitable for long-distance transmission. He had, however, successfully used the Thury system of high tension direct current transmission, which was known abroad. His view was that works should aim at fully utilizing their own surplus power instead of purchasing from a supply company, and he thought that the author had drawn a very fair and even comparison between the direct and alternating current systems.

W. F. Beardshaw, Sheffield, agreed with Col. Selby-Bigge, and observed that in some Sheffield mills they had found electric power decidedly cheaper than steam.

Alfred Hutchinson considered that electric power for steel mills had come to stay. He thought the reason why, at the beginning of this movement, so many works had installed a 3-phase plant was that the power companies seemed to offer a secure standby in case of possible breakdown. He suggested the possibility of the electrolytic production of nitrates for utilizing the week-end power.

Andrew Lamberton, Coatbridge, expressed his appreciation of the author's work, and said that he had during the week discussed electrical practice with an eminent American engineer, who was, he found, a strong advocate of alternating current. He had invited him to be present at the meeting, but he was unable to attend. He was rather surprised that no speakers had seriously advocated alternating current.

Edward Crowe, Saltburn, strongly supported the use of direct current, especially where machinery had to be brought promptly to rest. He also agreed entirely as to the advisability of linking up with power supply companies.

Open-Hearth Slags

Two papers on open-hearth slags were introduced by their respective authors. They were: "Notes on Slag Conditions in Open-Hearth Basic Steel-Making Practice," by J. F. Wilson, and "The Reduction of Silicon from the Slag in the Acid Open-Hearth Process," by B. Yaneske and G. A. Wood.

Dr. McWilliam said he welcomed further experiments by younger members on the acid and basic open-hearth. One point insisted on by Dr. Hatfield and himself in their previous work was that the reduction of silicon into the steel was a question of compensation of the slag rather than a matter of temperature, and it was very satisfactory to have this point, which at first had met with little or no support, now confirmed by more recent investigators.

Dr. W. H. Hatfield, Sheffield, joined his congratulations to those of Dr. McWilliam, his former collaborator in this field of research. He thought the author's theory of the formation of silicide of iron by reaction between iron and silica could be practically tested by a laboratory experiment in a small electric furnace. He questioned Mr. Wilson's statement that iron oxide relative to lime can act as an acid and, in steel furnace practice, can act as such at comparatively low temperatures.

E. W. Saniter, Rotherham, said that both papers suggested many new things and would repay careful study. He could not agree with Messrs. Yaneske and Wood's statement about free oxygen coming up through the metal sample, although he could not give any alternative explanation.

Mr. Hallimond thought Mr. Wilson's classification of slags far too simple. It was hardly possible at present to say with certainty what were the solid bodies present in basic slags. He thought at the temperature of the steel melting furnace none of the compounds could maintain themselves with such definiteness, and all one could say was that one had lime and magnesia at one end of the scale and silica at the other.

The president, referring to the alleged reduction of silica by iron, said he had taken the most siliceous open-hearth slag he could obtain and melted it down with electrolytic iron in an electric furnace at 1600 deg. C. No silicon was found to have combined with the iron, but it was possible that the iron might reduce the silica at higher temperatures. The whole question was undecided and hypothetical at present.

Features of Railroad, Coal and Steel Strikes

Troubles Due Largely to Unrest Following War —Promises Made by Leaders—Railroad Men's Complaint Due to Delay of Labor Board

BY CHESTER A. DICKHAUT*

So heavy have been the economic losses produced by the three major strikes, the railroad, coal and steel strike, all closely inter-related, that the public is in a receptive state of mind with respect to legislation designed to prevent such wholesale industrial disturbances. The three eruptions may be directly traced to the unrest which is an aftermath of the war and to the influence of the radical element among industrial workers. In many respects the strikes are identical in method and purpose. In no case except that of the railroad men was a definite statement of grievances or demand for better conditions presented to the employers before the men quit their jobs in their effort to paralyze industry and commerce. Instead they first walked out and then began formulating demands. Incidentally the steel strike was the first movement of its kind launched in America at a time when the men involved in it were earning high wages and had continuous employment.

If, in any case, the demands of the strikers seem to possess some merit, it is in the railroad disturbance, on account of the long delay of the National Labor Board in acting on the demands of the men.

Steel and Coal Strikes

The steel and coal strikes differ from the railroad strike in that foreign-born workmen were principally affected in the first two disturbances and union leaders directed their radical propaganda immediately to them. At the time the steel strike was called less than 10 per cent of the American-born workmen had been even asked to join the union and its entire membership did not include more than 30 per cent of employees in the industry. Employing companies knew that the workers were well paid, prosperous and generally satisfied. They did not count on more than the membership in the unions obeying the strike call, and believed that although it might be difficult, it would not be impossible to operate without that proportion of common labor. But the manufacturers overlooked certain other conditions upon which the strike had been planned and which for a time gave its leaders hopes of success.

Chief among these was a new feeling among workmen generally, and among those of European birth in particular, that revolutionary conditions prevailing in Europe could be brought about in this country. All three disturbances seem to trace much of their inception to this source. From sudden destruction in the Old World many workmen were easily led to believe that something of the same kind was to happen in the New World. Steel workers have already learned, in the majority of cases, the error of this assumption and any rail strikers who entertained similar theories will become convinced of their mistake sooner or later.

Less Work and More Pay

It is not likely, in the seething labor troubles of the past nine months, that even the most radical of the officials of the American Federation of Labor openly advocated or promised the overturn of the Government, but they did promise less work and more pay, terms in which the aspirations of workmen are always most simply expressed and most easily understood. It is certain that in the steel strike the organizers gave the ignorant foreigners assurance that success of the movement would bring about ownership of the mills by the men who worked in them.

Abundant evidence exists that, if the leaders did not actually advocate revolution, they at least made every use of revolutionary propaganda to bring about the strikes and keep them up. Since the upheaval in the steel industry last fall there have been 260 arrests by secret service operatives in the Youngstown district of foreigners suspected of disloyalty to the Government, and 23 men have been deported from that locality. Every one of these men was actively connected with the strike and most of them were in the pay of the unions. The same conditions existed at Gary, Johnstown, Pittsburgh and other steel centers, and large quantities of I. W. W. and other "red" propaganda literature were circulated in all these districts, being printed in a dozen different languages. This revolutionary seed fell upon soil well prepared by the propaganda sent out so voluminously during the war by idealists and experimentalists turned loose upon the country at that time, who imagined they were preaching the right of labor to a full partnership in industry, a task in which they were not at all embarrassed by vulgar considerations such as the providing of money for payrolls, remunerating investors, sharing possible losses and similar practical problems.

This was the situation that made the steel strike possible, and in the same way that produced the labor troubles in the coal mines and on the railroads.

Where the Strikes Differ

There has been a marked difference between the steel strike and the railroad strike with respect to the intimidation of workers and threats of violence. Fortunately, and it speaks well for American workmen, there has been little of this during the present disturbance. For the most part the railroad strike has been conducted in an orderly procedure, if a strike can be so conducted; at least there have been no attempts on the lives of volunteer or newly assembled crews which are rapidly taking the places of the yardmen and switchmen who walked out. There has been little or no interference by the strikers with attempts of the carriers to recoup their forces.

During the steel and coal strikes, on the other hand, there was much bloodshed in a number of communities and a number of lives were lost in clashes between strikers and military police. At that time there was a determined effort on the part of the strikers to intimidate workmen who preferred to resume their posts. This intimidation began with the calling of the steel strike. Almost every workman of foreign birth who had not joined the unions was notified to remain away from the mills under penalty of personal injury, damage to his property or outrage on his home. The writer has been shown the files of four large companies in the Youngstown district, in which the steel and railroad strikes have been most effective, containing hundreds of letters sent to their loyal workers. Many of them are decorated with skull and cross-bones or other deadly-looking devices used by foreign secret societies. These letters were often followed by actual attacks, usually outside of the policed district. Sometimes the home of the man who refused to strike was set on fire; at others his cow was mutilated in the stable; in one instance, relays of strikers paced up and down in absolute silence before the house of a foreigner who remained at work until his wife and children coaxed him from the mills. The effect of these methods among the foreigners cannot be fully understood by those not familiar with the fear inspired by such tactics. It was probably responsible for keeping more than half of the workmen out of the mills.

At the beginning of the steel strike about 90 per cent of the American-born workmen and about 10 per cent

*Youngstown correspondent of THE IRON AGE.

of those of foreign birth reported for work, but it was impossible to operate the mills without the unskilled labor. A peculiar fact was that, while the strke was directed specially at the works of the Steel Corporation, the independent mills were most seriously affected and the corporation's mills were generally able to keep in operation. Closing of the mills developed more or less sympathy with the movement among Americans, who were willing to share a victory, even though they had no particular grievances. This probably delayed the resumption of operations and in the Youngstown district about 30,000 men were idle for more than 10 weeks.

Many Forced Into Idleness

At the present time, in the same territory, 50,000 workers, most of them employed in iron and steel or fabricating plants, are either wholly or partially idle, rendered so by the paralysis of industry. It is significant, furthermore, that these men, thrown into involuntary unemployment by the "vacation" of the switchmen and yardmen, are not at all in sympathy with the methods employed by the railroaders, though they believe that the strikers should receive higher wages.

While there may be justification in the wage demands of the railroaders, it is generally conceded there was not this justification in either the coal or steel strike.

Unskilled labor in the steel industry is now employed on a basic eight-hour day, but economical operation requires that many departments, such as blast furnaces, open-hearth furnaces and coke ovens, be operated continuously. This requires either three shifts or one shift working 10 hours during the day and another 14 hours during the night. At present only two shifts are employed, although it seems likely that as soon as sufficient labor can be found and a general agreement arrived at, three shifts will be inaugurated. The long hours in the steel industry are an evil. No one knows this better than the manufacturers, who have been for years and are now endeavoring to find some way in which their mills can be operated on three shifts, with an eight-hour day. There is nothing more certain, as everyone familiar with the subject knows, than that foreign-born workmen in steel mills do not want eight hours of work at present wages. Any of them will tell you emphatically that his wages must not be reduced. And almost any of them prefers the long, or night shift, for the reason that the work is lighter and the pay larger.

As to wages, unskilled labor in the steel industry is now being paid 52.8 cents per hour, as against 19.5 cents per our on Jan. 1, 1916. In the interval wages have been voluntarily advanced nine times. On Oct. 1, 1918, an arrangement was made whereby all time in excess of eight hours was paid for at the rate of one-half more than the regular rate. The amount earned by unskilled labor is now $5.81 per day of 10 hours. For the night shift of 14 hours it is $7.39. This is the lowest rate. Semi-skilled labor and skilled labor are paid proportionately. A number of men in every large steel mill earn from $15 to $25 per day, and the average is probably about $10 per day.

Railroaders Paid Less

Railroaders, particularly those classes involved in the strike, have been paid much less.

The steel strike, the coal strike and the strike of railroad switchmen, all events occurring within a comparatively short period of time, have cost the people of this country more than enough to operate their Government during the same period under normal conditions. From a business standpoint, therefore, if for no other reason, accurate, definite information concerning the cause or causes of these disturbances, if they are to be prevented, is necessary.

While no figures are available as yet with reference to the cost of the railroad strike, it will run into millions of dollars. In the Mahoning Valley, for instance, the wage loss to workers alone is estimated at $150,000 daily, and the loss to the industries will be proportionately larger.

Estimating from the reduction of normal payrolls in four of the largest independent companies in the Youngstown district, the total wage loss to employees caused by the steel strike would not fall far short of $75,000,000. While it is not possible to give accurate figures on the loss to the manufacturers, in these four companies, the direct expense resulting from the strike averaged about $2 per ton on their maximum annual output, an amount that would fix the total expense to the steel industry at approximately the same figure as its employees lost in wages.

Loss to Workmen

No estimate, in either of the three strikes, can be made of the loss to workmen in industries paralyzed by a lack of raw materials, or of the reduction of earnings through interruption of operations of mills and factories. Most important of all, however, in all such disorders, is the loss sustained by the general public through interference with business and in the increased scarcity and higher prices of essential commodities, a matter in which every citizen is concerned. Add to these the anxiety and suffering resulting in hundreds of communities, the loss of life and the expense of maintaining order, and you have some idea of the cost of strikes.

These strikes are something in which the country at large is deeply interested. The general public also has a right to all the information it can get, especially since the Federation of Labor, in calling off the steel strike, announced that the truce was only temporary and that it proposed to begin the organization of another movement of the same kind.

It is evident and significant, too, that the three strikes have been called by leaders because they believed that unrest and radicalism had reached high-tide among the working classes in America.

RAILROAD MEN'S WAGES

Readjustment in Case of Decline of Living Cost Proposed at Hearing

CHICAGO, May 17.—The United States Railroad Labor Board opened final sessions in Chicago to-day to consider the employers' side of the wage question. The employees have already presented their case in a two weeks hearing, recently held in Washington. E. T. Whiter, chairman of the conference committee of managers, was the chief spokesman for the companies and made it plain that the carriers do not oppose a reasonable wage increase, but hope that any award will be qualified so that if the cost of living subsequently declines, another adjustment may be made. Mr. Whiter called attention to the fact that any substantial increase in railroad labor cost must result in increased rates to the public for railroad service, as clearly indicated by the Esch-Cummins law. He estimated that for every $100,000,000 added to the payrolls of the carriers, an increase of 3 per cent in freight rates would be necessary. Accordingly a 30 per cent rate advance would be asked if the Railroad Wage Board should grant the full demands of the employees. This would be in addition to the 28 per cent increase which the carriers are already demanding to cover the payroll increases during the past two years. Mr. Whiter stated that in 1919 railroad wages totaled $2,744,000,000, or 53.6 per cent of the gross earnings, as against $1,135,000,000 and 39.5 per cent in 1915.

B. M. Jewell, president Railroad Employees' Department, American Federation of Labor, issued a statement signed by nearly all the brotherhoods to-day, reiterating the position of labor. Only 2½ per cent of the railroad workers of the country, it stated, are receiving a living wage. On the basis of what is termed a bare subsistence level of earnings, $1,700 a year, 88 per cent of the railroad employees are found to be receiving less than that amount.

Twenty-three army motor trucks, under command of Lieut. James M. Matron, recently transported some 200,000 lb. wire fabric from the Clinton, Mass., division of the Wickwire-Spencer Steel Co., to the port of embarkation, Hoboken, N. J.

Short Trade Items

Under the direction of Fay W. Shackelton, formerly a captain in the United States army, the Japan plant of the Truscon Steel Co., Youngstown, Ohio, located on the national highway near Tokyo, is being erected and will be ready for production this summer. A prepoured in section wall along the canal side of the plant has been completed and a fence around the larger section, with pre-cast fence posts, using barbed wire, is finished. Concrete trusses for the main building have been poured for some time.

The Becker Milling Machine Co., Boston, and the Whitcomb-Blaisdell Machine Tool Co., and Reed-Prentice Co., Worcester, Mass., have opened a machinery display room and office at 408 Frankfort Avenue, Cleveland. C. A. Severin, formerly with the Cleveland Tool & Supply Co., has been placed in charge as manager, and will be assisted by Chas. Brandhill, who has been connected with the Becker company for several years.

Hoisting apparatus is discussed in No. 33 of the series of bulletins on "Safe Practices," issued by the National Safety Council, 168 North Michigan Avenue, Chicago. The bulletin deals with safe methods in the operation of hand and electric hoists, locomotive cranes and construction hoists.

The open hearth plant of the National Enameling & Stamping Co., Granite City, Ill., is to be redesigned for the use of hot metal direct from the blast furnace of the St. Louis Coke & Chemical Co. and for the use of gas and tar from the same company's coke ovens. Freyn, Bassert & Co., Chicago, have been retained as consulting engineers. The work involves the installation of hot metal ladles, a hot metal crane, tar storage tank and pumps, a tar circulating system together with a 1,000,000 cu. ft. gas holder and gas booster station with the line for coke oven gas to the open hearth. The coke oven gas and tar will be used for the 10 open-hearth furnaces and the tin house.

The Hoosier Rolling Mill Co., Terre Haute, Ind., has purchased 400 acres northeast of the city on which it plans to build a rolling mill; the present plant is to be moved to the new site. The contract for the proposed removal has not yet been let, as it is awaiting the sale by the Terre Haute Chamber of Commerce of several hundred lots near the site. J. R. Finkelstein is president of the company.

The Atlas Tack Corporation, Fairhaven, Mass., has purchased the tangible assets and good will of the H. C. Tack Co., Cleveland, and expects to continue the business done by that company. It hopes very soon to increase the capacity at that point and to standardize the product of that company with its own.

The Connellsville Electric Steel Co. has been organized to take over the plant of the United States Steel Co., Connellsville, Pa., which has been idle for some time owing to financial troubles. Nothing has been given out as to when the new company expects to start the plant.

The Berry Metal Co., New Brighton, Pa., is being reorganized. The company manufactures Berry's tinless phospher bronze bearing metal. W. D. Berry is president and W. V. Berry is secretary of the company.

Suit has been begun at St. Louis for a receiver for the Mid-Nation Iron Products Co. of Missouri, with offices in the Boatmen's Bank Bldg., St. Louis, by stockholders who make various averments as to the value of the properties included in the ownership of the company, the methods of the incorporators and officers. The company was incorporated in January, 1917, for $2,000,000, and a bond issue of $1,000,000 authorized. Earl A. Clemons is president of the company. Its properties are ore lands in Wayne and Butler counties, Missouri, which it was planned to develop.

The Bayview Foundry Co., Sandusky, Ohio, has increased its capital stock from $200,000 to $300,000 to provide for future requirements. The concern advises it does not contemplate any additions to its plant in the near future. It makes ferrous and non-ferrous castings, and also does a general machine business and is a maker of patterns.

In accord with an agreement reached by county commissioners of Lebanon county, Pa., with the Bethlehem Steel Co. and other owners of ore banks at Cornwall, near Lebanon, Pa., Judge Henry has confirmed the 1919 tax assessment of the banks at $10,000,000. The previous assessment had been $3,500,000, and the commissioners had attempted to boost it to $50,000,000.

Arthur G. McKee & Co., Cleveland, have received a commission from the Sloss Sheffield Steel & Iron Co. for equipping its city furnace at Birmingham, Ala., with a McKee revolving distributor. The Sloss Sheffield Steel & Iron Co. now has a total of five McKee distributors either in operation or under construction.

The Stewart-Warner Speedometer Corporation, Chicago, has effected arrangements for the absorption of the Stewart Mfg. Corporation, manufacturer of dies, die castings, etc., 4535 Fullerton Avenue, Chicago. This will be done through an exchange of stock. The companies have been affiliated in ownership, both having been organized by the late John K. Stewart.

The Pittsburgh Rolls Corporation, Pittsburgh, is adding a new roll turning shop to its plant. The building is to be 65 x 270 feet, of high and low bay design, and will be equipped with three 30-ton electric traveling cranes. The American Bridge Co. is erecting the building, and about 40 roll turning lathes and other equipment will be installed in it.

At a recent meeting of the stockholders of the New Britain Machine Co., New Britain, Conn., the capital stock of the corporation was increased from $2,000,000 to $7,000,000, of which $1,000,000 is preferred. The following officers of the company were elected: H. H. Pease, president; F. G. Platt, chairman of the board; A. Buol, S. T. Goss and C. R. Hare, vice-presidents; R. S. Brown, secretary, and H. E. Erwin, assistant secretary.

Peter A. Frasse & Co., Inc., New York, have purchased the stock of machinery and merchandise, and the good-will of the Frevert Machinery Co., 38 Vesey Street, New York. All of the employees of the latter company will continue with Peter A. Frasse & Co., Inc. The Frevert Machinery Co. has been in business since 1906 as a dealer in a general line of metal working tools and machines..

The N. E. Casting Co., Worcester, Mass., with a capital of $10,000, has been granted a Massachusetts charter to buy, sell and manufacture castings of all kinds. No effort to manufacture will be made at this time, however, the company confining itself to acting as agent for the general foundry business. Edwin W. Lynch is president and treasurer.

The American Metallurgical Corporation, Franklin Trust Building, Philadelphia, announces the receipt of contracts for the development of special alloys from the Branford Electric Co., Branford, Ct., and Brown Pyrometer Co., Philadelphia.

Six Scotch marine boilers with heads having a flat circle 119¼ in. in diameter and of 15/16 in. thickness with a straight flange of 7⅝ in., and a finished diameter of 15 ft. 3¼ in. are being built by the Bath Iron Works, Ltd., Bath, Me. The heads are being furnished by the Lukens Steel Co., Coatesville, Pa. Each head weighs in the neighborhood of 9000 lb.

The National Safety Council, 168 North Michigan Avenue, Chicago, announces the receipt from the British Consular General at New York of an order for twenty-three memberships desired for the chief inspector of mines, chief inspector of factories and for superintending inspectors in factories at various cities in Great Britain.

Mr. Campbell's Views on the Railroad Strike

President of Youngstown Sheet & Tube Co. Says It Could Be Settled by Employee Representation—Explains the Plan—Quotes from the Report of the Second Industrial Conference

PRESIDENT James A. Campbell of the Youngstown Sheet & Tube Co. believes the railroad strike could be quickly settled if there were some vehicle or medium, such as the representation system for employees, whereby the railroad workers might deal directly with their companies. "We have been suffering for several weeks from a situation which results entirely from an effort to handle questions between employers and employees through an organization which tries to serve workmen engaged in many different kinds of work and employed by many different companies," states Mr. Campbell. "The railroads would doubtless be glad to increase the pay of their switchmen, but no way can be found to do so because the interests of so many others are involved. If these men could deal directly with their companies, the trouble could be settled in short order."

Mr. Campbell has taken this occasion to impress upon employees of the Sheet & Tube company the benefits likely to accrue from the representation system, provided it is thoroughly understood. He says—"There seems to be some question as to whether everyone interested thoroughly understands the purpose and scope of the Employees' Representation Plan in operation in the plants of this company. The plan is working satisfactorily, but to produce the best results it should be familiar to all employed in the plants and, above all, they should know exactly what it is for and how much benefit they can obtain by complete co-operation with it.

"The plan is believed to be the most efficient form of collective bargaining between employer and employee that has been devised. It places under their joint control the settlement of questions that may arise and enables those who are familiar with such matters to discuss them fairly and thoroughly among themselves. It permits the adjustment of all such questions by people who are most deeply interested, and prevents the injection into these problems of other interests which have little or nothing to do with them.

"This method of maintaining friendly relations between employed and employer and securing for both justice and fair play has been recommended by all who have impartially studied the question and are not influenced by a desire to maintain other organizations over which they can rule and from which they can secure for themselves power and profit. Discussing the question of collective bargaining, the report of President Wilson's second Industrial Conference, composed of 17 men chosen for their fitness to represent all parties to the question, and headed by Secretary of Labor William B. Wilson as chairman and Herbert Hoover as vice-chairman, said: 'The guiding thought of the conference has been that the right relationship between employer and employee can be best promoted by the deliberate organization of that relationship. The organization should begin within the plant itself. Its object should be to organize unity of interest and thus diminish the area of conflict, and supply by organized co-operation between employers and employees the advantages of that human relationship that existed between them when industries were smaller. Such organization should provide for the joint action of managers and employees in dealing with their common interests. Industrial problems vary not only with each industry, but with each establishment. Therefore the strategic place to begin the battle with misunderstanding is within the plant itself.'

Purpose of the Plan

"This is exactly the purpose and method of our representation plan. To make it most effective and to secure the best results, every man working in the plant should take an interest in it. This interest should begin at the election of representatives, but it should not end there, because the best representative cannot accomplish much unless he has the entire confidence and co-operation of the men he represents.

"Therefore I hope that every man working in our mills will understand how much he has at stake in the representation plan. I hope that everyone will see it for just what it is—a method to bring the men and the company closer together, so that each may better understand the needs of the other and both be thus better able to work in harmony for the good of all.

Unless the company is prosperous and successful, those who work for it cannot hope to be steadily employed and well paid. And unless harmony exists between those who furnish labor and those who furnish capital to conduct operations not only in our own industry, but in others on which it depends for raw materials, transportation and markets, there is certain to be interruption of work, lost time and eventually great injury to both workers and the company.

"I would ask every man working in our mills to study this matter carefully, confident that he will then understand more fully the value to him and his fellow workers of a plan which enables employee and employer to deal with one another amicably and intelligently, and avoid complicating their relationship with the needs or desires of others who work under entirely different conditions."

Youngstown Conditions Unsatisfactory

Production Curtailed and Companies and Men Suffer Heavy Losses

YOUNGSTOWN, OHIO, May 17.—No evidence of recovery from the serious loss in iron and steel production occasioned by current railroad disorders is apparent in schedules of Mahoning Valley producers this week. What few gains are made by some are more than offset by curtailments of other makers. At the beginning of the sixth week of the switchmen's strike, industrial operations are still largely paralyzed and schedules are mapped out on a "hand-to-mouth" basis. While operating heads of the carriers have strained themselves to improve transportation, their efforts, for the most part, have proved abortive. A majority of the striking railroaders are still idle, marking time, forcing 40,000 industrial workers into voluntary and unwelcome idleness and crippling industry. By their refusal to work, from 1200 to 1400 men have brought stagnation upon the Valley, causing an immediate loss that will mount into millions of dollars. Loss to wage earners alone is estimated from $6,000,000 to $7,000,000. During May, pig iron output has approximated one-third of normal; open-hearth departments have averaged less than 50 per cent and Bessemer units approximately one-third. With other districts on a much better producing basis, the loss suffered by stockholders in Valley steel companies will aggregate a huge sum. The community is aroused by the fact that this

section is perhaps the hardest hit in the country and that no immediate relief is in sight.

In face of accumulating labor difficulties, the carriers have moved considerable tonnages of raw materials into the plants and have removed finished and semi-finished steel. This movement, however, has been insufficient to reflect itself in enlarged operating basis. On May 14, the number of active stacks in the Valley was reduced when the Republic Iron & Steel Co. banked two of its going furnaces in the Haselton group. Mary furnace at Lowellville of the Sharon Steel Hoop Co., started last week, is threatened with idleness if the sporadic fuel supply fails.

Other producing stacks in the district are in imminent danger of banking.

Representatives of industries, commercial houses and civic bodies from Youngstown, Warren, Niles, Girard, Sharon, New Castle, Farrell, Lowellville and Struthers conferred May 17 with reference to terminating the strike.

Carry-over to Third Quarter

There will necessarily be a large carry-over from the second to the third quarter of orders on books of the makers, its volume depending on the length of the industrial suspension. Even after the strike ends, it will be some time before the mills are again able to get on a normal footing because of dislocation of their working forces and the necessity of first removing piled tonnage that has reached large proportions. The only outbound movement has been in trainload shipments, which have been made principally to the Detroit and New England districts. Fabricators in this territory have been enabled to maintain their plants by bringing in steel in trucks. Bars, sheets and plates have been procured in this manner in one to five-ton lots. While truck shipments have been made over long distances, they have proved too expensive and too slow to be of value in relieving congestion. For short hauls, though, such movements have been satisfactory and have been the means of preventing wholesale suspensions by large fabricating interests. They are suffering, however, from lack of cars to ship their output, the supply of box cars being especially short. One such interest is reported to have $400,000 worth of steel furniture and office equipment ready for shipment, but held up by lack of cars.

Open top cars are in more plentiful supply and a better movement of ore from the Lake docks is under way.

Railroads have started to build up new organizations to replace the old ones, disrupted by the strike, but it is admitted the process will be a slow one. The strikers seem impervious to every kind of argument and look with suspicion upon the efforts of not only fellow workers but disinterested mediators to bring about a temporary settlement of differences, at least. They have turned a deaf ear to all pleas to resume work pending adjudication of the wage dispute and have alike ignored threats of loss of seniority rights. Railroad workers from other centers have been imported to influence the insurgents, but without success.

Status of Operations

Operation of the hot mills of the Sharon Steel Hoop Co. is for an uncertain period. Republic Iron & Steel Co. started the week with two blast furnaces, 13 open hearths and the plate mill. The Brown-Bonnell and Bessemer departments are wholly suspended. Accession in operations is reported by the Brier Hill Steel Co., which started its Western Reserve works at Warrent on the midnight turn, May 16. This maker is operating one blast furnace, six open hearths and its sheet mills to 80 per cent of normal. Youngstown Sheet & Tube Co. and Carnegie Steel Co. continued schedules unchanged, the Carnegie company having three furnaces in blast at the Ohio Works. Its bar mills are suspended. Trumbull Steel Co. has added two open hearths to the active list, operating five of seven blooming and bar mills, eight sheet mills and the hot and cold strip mills. Newton Steel Co. has resumed at its Newton works after a week's shutdown. Falcon Steel Co. is maintaining a good percentage of production.

In the Shenango Valley, schedules are being more successfully maintained. With arrival of 175 cars of coke, the Carnegie Steel Co. started blast furnace No. 2, which had been banked and now has two of its three stacks in commission. The American Sheet & Tin Plate Co. and American Steel & Wire Co. are back to normal this week, getting materials in trainload lots and are well fortified as far as coal, coke, steel and ore are concerned.

The Standard Tank Car Co. last week shipped from its Sharon, Pa., plant 123 tank cars, forming a train over a mile long, and destined for Texas points.

Start Work on Stack

Engineers have started work on the new 600-ton blast furnace to be built by the Trumbull-Cliffs Furnace Co. to supply the pig iron needs of the Trumbull Steel Co. at Warren. The stack will be erected on a site directly across the Mahoning River in Trumbull County from the steel plant of the Trumbull company, which is in the market for structural steel for a hot-metal bridge to connect the two plants.

Naturally, under present conditions, no effort is being made to contract for business. No shipments of pig iron can be made and steel plants are booked for months ahead. They are in no disposition to entertain any business under present conditions. In the semi-finished market, makers are getting further and further behind on deliveries of iron and steel bars. The strike has thrown shipments of all material back from eight to ten weeks. Reports reaching this territory indicate that tin plate producers are in no shape to meet demands of can manufacturers and a light pack of fruit and vegetables is anticipated. Consumers of sheets are especially insistent for material and in many cases, apparently, do not realize the wholesale stoppage to shipments brought about by the strike. The only way sheets can be shipped is in trainload allotments, all product consigned to a single district, though to different buyers. Dealers and brokers in this territory have been able to make satisfactory purchases within recent weeks, though they, too, are confronted by the problem of delivery. Sheet production continues much more satisfactory, proportionately, than any other finished product.

Machinists' Strike Wanes

CINCINNATI, OHIO, May 17.—Signs that the machinists' strike in this city is slowly petering out are seen in the fact that on Monday morning over 150 men who had been out reported for work at different plants with the same number going back during the past week. This makes a total of 300 who have applied for reinstatement during the seven days. Only one additional plant was affected, 52 men going out. A total of 66 shops is directly affected, 12 of these being closed, and the rest working with reduced forces. Some dissatisfaction is expressed among the strikers at the way the affair is being handled by their leaders, and this week is expected to see the climax, as it is reported that notice has been served on the union officials that if the plants in the Oakley colony are not "pulled" this week, a large number of the rank and file will return to work next Monday.

Threats of a general strike in case employers seek to get an injunction restraining picketing are made by officials of the machinists' union, but these are not being taken seriously, as it is generally felt that if the leaders are finding it difficult to call out the men in their own trade it would be next to impossible to get men not directly interested in the affair to go out in sympathy.

River Workmen May Strike

UNIONTOWN, PA., May 18.—A new angle in the transportation strike looms in the region as a result of a strike vote being taken by river craftsmen making up the crews of boats plying the Monongahela River and carrying huge shipments of coal to steel companies in the territory. With the shifting railroad situation,

which has reduced coal and coke shipments to a minimum, a river tie-up would hit the region a terrific blow.

The H. C. Frick Coke Co. has been shipping thousands of tons of coal a week from its Klondike region mines by river, the coal being removed from mines as far as seven miles back from the river by means of an underground haulage system. The Youngstown Sheet & Tube Co.'s operations at Nemacolin would be forced to suspend, inasmuch as the railroad extension to these operations has not been completed. Dozens of other operations would be tied up and the steel companies which have been relying upon river shipments from mines along the Monongahela River to keep their plants supplied with fuel in the present railroad tangle will be put hard against it to save themselves from suspension.

River craftsmen are asking increases which operating companies say cannot be paid.

Hours-of-Work Problem in Major Industries

THE National Industrial Conference Board has just issued a summary report on its investigations of the hours-of-work problem in five major industries—cotton, wool, silk, boot and shoe, and metal manufacturing.*

The data for this report were secured by questionnaires supplemented by extensive field work and include detailed production figures from the records of various establishments. In all, 1818 representative establishments were investigated. Of these, 749 establishments, employing 580,168 workers, had reduced hours and furnished definite information regarding results.

The broad conclusions reached by the board may be summarized as follows:

No single schedule of hours is equally adaptable for all industries from the standpoint of production. The evidence is overwhelming that maximum efficiency cannot be obtained in all industries with any single specific work-day.

In general, the ability to increase hourly efficiency and thus make up, either wholly or in part, for reductions in hours was largely determined by the amount of handwork, as distinguished from automatic machine work, which is performed in any given process. Thus, those industries characterized by a relatively large amount of machine work as a rule showed a marked decrease in output when hours were reduced.

In the Northern cotton industry reductions to less than 56 hours per week involved a loss in output in more than 90 per cent of the establishments, and in a majority of cases this loss was approximately proportional to the reduction in time.

Metal Working Plants

Analysis of the evidence submitted by metal manufacturing establishments indicated that, while a universal reduction to a 50-hour week would involve loss in production, nevertheless, a 50-hour week could be rather generally introduced without seriously curtailing output. In a number of establishments production was reported as maintained with a 48-hour schedule, but it appeared that a general reduction to a 48-hour week in the metal manufacturing industries would result in a decided loss in output.

The evidence did not indicate that mere size of an establishment was an important factor bearing on the efficiency secured under a given schedule.

Within a given industry the special character of the goods manufactured apparently did not have a controlling influence on production, with the exception of those products the manufacture of which is largely dominated by machinery.

The evidence clearly indicates that the piece-rate system is more conducive to efficiency than the day-rate system.

Conditions as to Health

The report states that definite data upon which to base conclusions as to the effects on health of shortening hours are not in existence. Speaking broadly, it may be said that such evidence as was found did not indicate that reductions in hours had as yet produced noticeable effect on health.

The report points out that mortality statistics published by the United States Census and by various life insurance companies clearly show that the death rate from tuberculosis, especially in certain occupations, for example, cotton and silk, is excessive.

A question as to the effects of reduction of hours on frequency of accidents was included in the hours-of-work questionnaire, and definite answers were m. on this point by 299 establishments among the five industries. Two hundred and fifty-five employers, or 85 per cent, found no change in accident frequency following reductions of work hours. Thirty-seven, or 13 per cent, observed a decrease varying from a "slight reduction" to a "reduction of nearly 50 per cent in serious accidents." On the other hand, seven employers reported an increase in accidents, which they attributed as a rule to new men hired to maintain output after hours had been reduced.

"Health and output," says the report, "are not the only considerations to be taken into account in determining hours-of-work schedules. The broad social aspects of the problem are also of great importance. Efforts to determine a proper schedule for a given industry must take these considerations into account. The work schedule should not be determined on the basis of any single factor by itself, but with due consideration for all these factors and with a due appreciation of their close interrelationship."

The report includes 23 tables and two charts which present much interesting data based on the experience of a large number of plants. Conditions peculiar to the industries included in the investigation are clearly distinguished and many factors of the hours-of-work problem are discussed.

The board is now engaged in an extensive investigation of the work week of 48 hours or less. It is expected that a report setting forth practical experience with such schedules will be issued in the near future.

*Research Report No. 27. Hours-of-Work Problem in Five Major Industries.

Many Unemployed in Detroit

DETROIT, May 18.—Conservative estimates to-day place the number of unemployed in Detroit at 20,000, an increase over last week of several thousand. These figures are based on a canvass by the Employers' Association of Detroit. The Association of Building Construction employers assert that 2,000 men in building trades are on strike beyond the 20,000 unemployed as the result of strikes and coal and material shortages. About 10,000 floaters are estimated. This is only about half the usual number of floaters, who nowadays are showing a tendency to hold on to jobs. Meanwhile the railroad situation, which last week showed some improvement, begins to look more serious than ever.

Public utilities in Detroit and throughout the State exist on a hand-to-mouth coal supply. The general opinion is that, while Detroit railroad yard conditions are on the whole a little better than a month ago, improvement must be nation-wide before the city can benefit as a result.

The General Electric Co., Lynn Mass. announced, May 17, the inauguration of a policy of curtailment which will result in the laying off of 1500 to 2000 employees this week. Retrenchment is necessary, it is said, because of delay in receipt of raw materials and cancellation of a large number of orders.

PRIORITY ORDERS

Plan for Relieving Congestion—Severe Car Shortage in Leading Centers

WASHINGTON, May 18.—Issuance of priority orders as a means of relieving unprecedented traffic congestion is being considered by the Interstate Commerce Commission, following a formal request by the railroad executives that the commission use its emergency power under the transportation act. It was announced that the commission would attempt to relieve the situation at congested centers but would not issue blanket orders covering the entire country.

The priority orders suggested by the executives were requested so that:

(1) Necessary food, fuel and other vital commodities directly affecting the cost of living and the life and comfort of the people, may have preference and priority in movement.

(2) That empty equipment, particularly box, refrigerator, stock and coal cars needed to move these commodities, may have like preference and priority in movement to those sections of the country where they are currently required for loading.

(3) That for these purposes and under the orders and directions of the commission, the carriers may be authorized, so far as necessary, to postpone or delay the loading and movement of other less important commodities, including to the extent from time to time necessary the reduction of existing passenger service, and generally to take such other action as the commission, under the exercise of the powers aforesaid, may find proper and necessary to currently meet the conditions aforesaid.

(4) That to the extent the commission may find necessary and may by order authorize, the carriers may be relieved from the operation of Federal and State laws and orders recognized as ordinarily effective during normal transportation conditions and governing the service of the carriers in the usual and ordinary conduct of their public service, so that in adopting and carrying out the orders issued by this commission during the present emergency, the carriers may be protected against penalties and complaints which would otherwise accrue, and be enabled to lawfully adopt and currently apply the necessary emergency measures as the commission may order to relieve present conditions.

Coal and Coke Production

Further details as to the effect of the traffic conditions upon industry are given in the weekly report of the Geological Survey on coal and coke production. Little improvement was indicated during the week ended May 1. The lack of empties at the mines far outweighed all other causes of lost time. Losses attributable to mine labor were of small moment.

Over the country as a whole the mines were closed down from 45 to 47 per cent of full time because of the car shortage, or in other words, about 22 hours out of the 48 working hours.

The switchmen's strike continued to hamper to varying degrees of severity the movement through most of the principal gateways and junction points east of the Missisippi, and north of the Ohio and Potomac. The yards at Kansas City, St. Louis, Chicago, Columbus, Cincinnati, Cleveland, Toledo, Pittsburgh, Buffalo and New York were partially paralyzed.

Out of 25 districts east of the Mississippi from which reports were received, only three experienced car shortage loss smaller than 20 per cent of full time; in 15 the loss exceeded 50 per cent, and in seven, Pittsburgh, Somerset, Logan, Hazard, Harlan and northeastern and western Kentucky, the loss exceeded 60 per cent. In the majority of the fields conditions changed for the worse. West of the Mississippi an improvement in the car supply was reported.

Production of beehive coke during the week ended May 8 declined to 353,000 net tons from 359,000 tons the previous week. This was barely 75 per cent of the rate which prevailed before the strike.

The total output of soft coal during the week ended May 8, including lignite and coal coked, is estimated at 9,069,000 net tons. This was an increase over the preceding week of 173,000 tons or two per cent. In spite of the increase production was still 1,946,000 tons behind that of the last normal week, March 22 to 27.

RAILROAD LABOR BOARD

Much Time Consumed by Arguments of Labor Union Leaders—Hearing Progresses

WASHINGTON, May 18.—After hearing the labor side of pending wage controveries, the Railroad Labor Board has started at Chicago the hearing of railway executives. The entire time of the board since its appointment until a few days ago was taken up with the hearing of the brotherhoods and railway labor unions who have presented numerous witnesses with voluminous statistical matter to support their cause. Failure of the board to reach any decision thus far is due in considerable part to the lengthy arguments made by the labor union representatives. Throughout last week W. Jett Lauck, former secretary of the War Labor Board and now an economist employed by brotherhoods, has been engaged in presenting the results of an investigation bearing on wages and the high cost of living. It has been Mr. Lauck's contention that advances in wages heretofore made to workers have not been responsible for present high prices, but that excessive profits made by large corporations have been the chief cause of the advances in the cost of living.

The Railroad Labor Board has now moved its headquarters to Chicago, where its permanent offices must be located under the terms of the transportation act.

The spokesmen for the railway executives are being heard at Chicago. It is expected that the executives will be comparatively brief in presenting their side of the case. While no definite day has been set for the decision by the board, its members believe that an undue amount of time will not elapse in view of the large issues involved and the comprehensive nature of the questions taken up.

In the meantime it is recognized that the delay in a decision in a settlement of the wage controveries is contributing to the unsatisfactory conditions at the leading railroad centers of the country. Many of the railroad yard men and switchmen are still on strike and all efforts to induce them to return have proved unavailing.

The Interstate Commerce Commission has taken cognizance of the situation by addressing a telegram to mayors of 15 cities asking their co-operation in bringing about a relief from the congestion at the railroad yards, due primarily to the strike. In its telegram the commission did not refer to the parties to the controveries, but believed that something should be done to prevent a tie-up, and prevent threatening the movement of crops as well as other important commodities.

Railway executives have appealed to the Interstate Commerce Commission to exert their authority under emergency powers given by the transportation act to issue priority orders in an effort to clear up the traffic congestion. O. F. S.

Labor Notes

The strike in the Kewanee, Ill., works of the Walworth Mfg. Co. which began March 15 when the employees walked out at 10 a. m. without notice, ended six weeks later with their return to work under the same conditions that prevailed before the strike. Signed agreements with the unions and the closed shop idea were the issues brought up. After the plant started operation, the strike was called off by vote of the several unions involved.

Some 200 employees of the General Electric Co., West Lynn, Mass., who walked out because of dissatisfaction with a system of time keeping employed for the purpose of determining proper wages to be paid for certain classes of work and proper selling prices for certain products, have returned to work.

The 380 molders and coremakers of the Erie, Pa., plant of the General Electric Co., are out on strike, asking for $7.20 for an 8-hr. day.

The molders and coremakers of the Houston Car Wheel & Machine Co., Houston, Tex., went out on strike May 12, demanding $7.20 per 8-hr. day.

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EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

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Steel Corporation Capacity

For 1914 the United States Steel Corporation reported an output, in steel products for sale, of 9,014,512 tons, stating that the output was 62 per cent of capacity, and for 1915 the corporation reported 11,762,639 tons output, at 81 per cent of capacity. For each year the capacity computed from the figures given is 14,500,000 tons a year. For 1919 the corporation reported 11,997,935 tons output, at 74.5 per cent, so that rated capacity for 1919 was 16,200,000 tons. The increase in rating is thus less than 12 per cent. One may suspect that the corporation's latest rating is a particularly conservative one and that under ordinarily favorable working conditions an output will be realized in excess of this rating.

Even with some allowance for conservatism in rating by the Steel Corporation, the independent capacity has been increased much more since the beginning of the war than the Steel Corporation capacity. The steel ingot output of the country in 1913 was 30,280,130 tons, while the report of the American Iron and Steel Institute for March showed an output in that month by the 30 reporting companies indicating that in March the country as a whole was producing ingots at the rate of about 45,200,000 tons a year. In 1913 output was restricted by lack of orders in the late months. A scrutiny of the monthly reports THE IRON AGE presented at the time, showing the pig iron output of the steel works blast furnaces, indicated that production averaged a trifle more than 90 per cent of the rate obtaining when operations were not curtailed by lack of orders or by the floods in the early spring. No one was disposed to estimate, last March, that the steel output at that time was at as much as 90 per cent of capacity under reasonably favorable working conditions. The increase from 30,280,130 tons produced in 1913 to a rate of 45,200,000 tons last March is 50 per cent, but the increase in capacity has apparently been a trifle more than that. Yet the Steel Corporation claims only 12 per cent increase in its own case.

The Steel Corporation's rated capacity of 16,200,000 tons a year, of steel products in the form in which sold to outsiders, is equal to 52,500 tons per working day. The 10,359,747 tons of unfilled obligations reported as on books April 30 is equal to 197 times 52,500 tons. Thus if the business were equally distributed according to the respective capacities of the various finishing departments it would be equal to capacity operation for 197 working days, or about 7.7 months. During the first three months of this year the corporation operated at about 90 per cent of capacity, and on such a basis the equivalent would be about 8.5 months. Allowance should be made for material already made but not shipped, also for curtailment of production since the rail strike started, but by any method of figuring it appears that the corporation is sold up somewhat past January 1 as an average date.

In contrast with this situation it may be noted that some independent producers promise shipment on new orders in two, three or four months, while disregarding the rail strike of the past few weeks some have been promising shipment in as many weeks. In view of the higher prices the independents are asking, as compared with Steel Corporation prices, it seems reasonable to assume that whatever business an independent has on books it is sold up rather solidly for some given period. In other words, it is improbable that an independent could sell at its advanced price, whatever that price may be, for delivery five months hence and still have material for shipment in two months lacking a purchaser at the same price. Evidently then the independents as a class are sold up to less than one-half as great an extent, relative to capacity, as is the Steel Corporation.

Foreign Trade and Exchange

Exchange rates in future between the United States and foreign countries will tend to produce the relation necessary between our imports and exports of merchandise. In other words, we cannot elect that the proportion shall be so and so and have our expectation realized. Settlements for merchandise have to be made. They cannot be made in gold, for the world's gold production outside the United States is less than $400,000,000 a year, and we are dealing with a figure several

times that amount. Theoretically, settlement might be made chiefly in securities, but the movement of merchandise will be influenced much more easily than the movement of securities.

After proper allowance for the invisible balance of trade, if we import less than we should, in relation to our exports, the price of exchange will fall, thus reducing to us the price of foreign goods, and advancing the price to foreigners of our goods, whereby the necessary adjustment will be forced. We shall have nothing to say. To control the matter it is necessary for us to act through the medium of our purchases and sales. The exporter cannot force the situation. He may build up a foreign clientele, at great expense, and then see the exchange rate advance the prices the foreigner must pay to get those goods, without the exporter receiving any higher price, whereby the foreigner may refuse longer to buy. We cannot dictate what shall occur, but will have to manage things right if we wish our desires to be realized.

Before the war it was necessary for us to export about $500,000,000 more merchandise a year than we imported, taking values as reported in the statistics, in order to equalize an unseen balance of trade, which was against us to about the amount mentioned. We did not find it particularly easy to do this, hence there was constant urging that we endeavor to increase our exports. Imports as reported are valued at the foreign port, hence freights paid to foreign vessel owners on our imports were against us. Exports are valued at our home ports, but we received, as an offset, scarcely anything in freights paid by foreigners to American shipowners on these exports. American tourists spent money abroad, and foreign born, residing here, sent money to relatives abroad, sometimes leaving the country and taking money with them. Several billion of our securities were owned abroad and we had to take care of interest and dividend payments. The net of all this was about half a billion dollars a year, which we made up by exporting correspondingly more than we imported.

No precise estimate can be made as to the unseen balance in the future. Interest and dividend payments will be in our favor instead of against us. The drafts by the foreign born earning money in this country will be much less than formerly. American tourists abroad may spend more or less than they used to do. As to ocean freights, the balance will be in our favor. According to the latest figures, 40 per cent of our imports are in American vessels, and 60 per cent in foreign vessels, the 40 per cent being nearly all an addition to our revenue, but there is much more than that, since 50 per cent of our exports are in American vessels, nearly all of this being a clear addition.

Thus the unseen balance will be very largely in our favor, perhaps more than half a billion dollars a year, in place of there being a half billion dollars a year against us, as was the case before the war.

Gold being out of the question as a means of settlement, the balance, apart from merchandise, will have to be settled by the movement of securities. Assuming for argument that the unseen balance will average half a billion dollars a year in our favor, we could have exports and imports equal and buy a half a billion a year of foreign securities, or invest the amount abroad, or we could do nothing in the latter matter and simply import half a billion more than we exported. Or we could export half a billion more than we imported and invest a billion a year. But if we attempt to do the impossible, to refrain from buying foreign securities or investing abroad and yet attempt to export more than we import, the exchange rates will simply fall and apply the corrective influence to our foreign trade, whether we want it to or not.

Prolonging Useful Life

Boston hospitals are co-operating with owners of industrial plants in the systematized study of the physical condition of older employees who are sent to them with the idea of ascertaining how years of usefulness may be extended. Every large business establishment has men advancing in years whose services are essentially valuable because of long experience coupled with native ability. One after another they give out, some gradually, others suddenly, as serious illness attacks them.

While it is true that no man is irreplaceable, the loss of some is felt much more keenly than the loss of others. The fact is it may be really costly in money when some men are compelled to leave the posts they have held so long. There is also what may be termed the sentimental side of cases of old and valued employees; to many of their associates the loss is a personal one. From every point of view, if such a man can be put on his feet again physically, it is very much worth while. The purpose of the co-operation of the Boston hospitals and those of other New England cities to which the practice has spread is to find the means, if there be means, of accomplishing this result.

In establishments where compulsory physical examination is practised, when an employee is sick his case is brought automatically to the attention of the works physician. If he be of the type under consideration, he is sent to a hospital for observation. He may not be really sick, as laymen think of sickness; he may still be able to do his daily tasks. Nevertheless, if he follows the doctor's orders, he must go to the hospital. There his case is carefully diagnosed, not hurriedly, but over several days, affording plenty of time for getting a record of the functioning of his vital organs.

Once the case is known, its treatment is prescribed, and there is laid out for the man the general mode of the life he must live to put himself in condition and keep himself there. His degree and kind of exercise are determined: he may need a lot of it, or he may have to shun it. If the case requires, his diet is carefully prescribed. He leaves the hospital with the knowledge of just what to do, and with the stimulating thought that if he does it, he can resume his old place and keep it indefinitely. Nothing has been left to

chance, so far as science can prevail over the human body and mind.

In a good hospital the patient has all the advantages there are, including the skill of a corps of specialists. The results are obvious; in practice they have been proved. Even in the short time the system has been in operation men who had abandoned all hope of resuming life in their old employment have returned to work, their usefulness unimpaired. Those who have been studying the system believe it has already been demonstrated that vast numbers of men are compelled to abandon their labors years too soon, because no effort is made to get at the root of their trouble and apply the remedy.

World's Need for Galvanized Sheets

An interesting feature of American steel export trade since the war has been the movement in galvanized sheets. A constant expansion has been in progress until for 1919 these exports exceeded the 1913 outgo by over 33 per cent or 101,600 gross tons as against 71,200 tons. The 1919 rate of 8500 tons per month is still being maintained. The heaviest buyers are the South American countries, Canada, Australia and Japan in the order mentioned. In 1919 South America took about 17 per cent of the total exports, Canada about the same and Japan about 15.5 per cent.

British exports of galvanized sheets, only 736 tons per month in 1918, increased in 1919 to 15,500 tons per month and in the first quarter of this year were 33,280 tons per month. Before the war Great Britain was the largest exporter of sheets, the outgo for 1913 having been 63,500 tons per month.

The world demand for galvanized sheets is very heavy. In 1913 839,255 tons, or 70,000 tons per month, represented the combined British and American exports. These same exports amounted to only 69,500 tons in 1918. Last year they were 287,700 tons or still only about one-third of the pre-war exports.

When one considers the reduced operations of continental Europe in the manufacture of sheets, the facts spell unmistakably a world demand for American and British galvanized sheets of large proportions for some years to come and a certain activity in the foreign American zinc trade as well.

Comment in these columns last week on the manganese situation was based on facts as developed by the progress of the industry so far as known up to that time. Since then it develops that one large producer of ferromanganese has 35,000 tons of manganese ore en route to North Atlantic ports or discharging at the seaboard—a total nearly equal to the ore imports for the first quarter. The same interest also will in the very near future be producing at least 2500 tons per month of ferromanganese in a furnace recently on pig iron and in July will start another stack which is expected to turn out 2000 tons per month. This increased output will tend to cut down decidedly the apparent shortage of 5000 tons per month, referred to last week, although the full effect will not be apparent until early in the second half. The fact remains that there is the possibility of a shortage of the alloy both here and in Great Britain and that conservatism in its use and the employment of substitutes are commendable.

Liberty Bonds and Thrift

The rapid liquidation of the small denomination Liberty bonds, which has been in progress since the close of the war, may seem discouraging at least when considered in connection with thrift among industrial workers. The percentage of sales of $50 and $100 bonds, as compared to total holdings, is a large one, though just how large cannot be more than estimated, for there is no statistical information on the subject. However, it is held that the percentage is no larger than was expected, and perhaps not so large. Certainly the lesson of thrift taught by the Liberty bond issues has not been proved lacking in beneficent influence.

An eastern manufacturing city of some 200,000 people, whose workers are of a high average of skill, affords some measure of the results of liquidation and at the same time gives assurance that the greater volume of sales of bonds of low denomination is at an end and that purchases by persons of small means are now nearly equal to the sales. The city's subscriptions for $50 and $100 bonds totaled something over $20,000,000, for the most part from employees of industrial plants. It happens that practically all bonds bought and sold in the community pass over the counter of one local banking house, so that amounts can be given with some degree of accuracy. The average daily sales of the small bonds has been upward of $20,000, or more than $6,000,000 a year. At periods where large firms delivered the paid-up bonds to their employees, the figure has run up as high as $75,000 a day.

Naturally the biggest factor of the liquidation is extravagance. But it is not the only factor. Waste has also come from the yielding to brokers in get-rich-quick investments, promising high returns, and usually meaning total loss. More pleasant to contemplate is the conversion of the proceeds into home properties. Then there is the element of suspicion, which impelled those who could not visualize a bond as money, most of them foreigners, to transfer their saving to the banks. Many other thousands were taken away by foreigners returning to their home countries. Of the total of sales, the larger part has been spent or thrown away, a smaller part reinvested wisely enough or used for useful purpose.

The large element of the naturally unthrifty will never save unless it be under compulsion or impulse, and even then the thrift is usually a transient one. In the war, everyone who could possible afford it subscribed for the bonds, most of them actuated by a spirit of pure patriotism. The unthrifty saved with the thrifty. The thrifty still have their bonds or the equivalent. The unthrifty have unloaded for cash, and have spent the cash. Their influence is no longer felt in the bond market to any appreciable extent. Bonds bought on the instalment plan have been paid for and delivered; the high waves of sales which followed the delivery of the paid-up securities

have ceased. Purchases are closely approaching sales in their totals.

The final result is that much more than one-half the savings represented by the several bond issues among persons of small means still exists. To very many thousands of them their subscriptions were the beginning of their thrift and, as a direct consequence, they are continuing their savings in other forms, many of them with the co-operation of their employers. Instead of the final reckoning of the bond issues being one of discouragement, it is a cause for sincere congratulation.

Evidence continues to accumulate to the effect that the United States has become a zinc exporting nation. Data for 1919 and 1920 demonstrate this. Before the war, or in 1913, Germany and Belgium supplied most of the European demand. In that year American exports were only 1,297,000 pounds per month. While during the war the demands on the American zinc industry vastly increased, it is interesting to note that the present export rate of zinc as pigs, slabs, etc., was 22,750,000 pounds per month for the eight months ended Feb. 29, 1920. It was even larger than the 1919 outgo, which averaged 20,319,000 pounds per month. Great Britain and France are the largest buyers, the former taking more than twice the latter. Japan is also a large factor, having bought as much in the eight months ended with February this year as in all of 1919. This movement is being reflected in Great Britain's exports of galvanized sheets, which were 99,846 tons in the first quarter of this year against only 10,066 tons in the same quarter of 1919. It is estimated that British buyers will take 10,000 to 12,000 tons of zinc monthly for some time and that it will be many months before German or Belgian zinc can be produced to compete with American.

Engineers to Organize for Public Welfare

A meeting of engineering organizations, national, state and regional, has been called for June 3 and 4 at Washington, D. C., to organize a permanent body which shall provide the machinery "to further the public welfare wherever technical knowledge and engineering training are involved and to consider matters of common concern to these professions. All engineering organizations whose chief object is the advancement of the knowledge and practice of engineering and the allied technical arts and which were not organized for commercial purposes are expected to send delegates to the Washington conference."

The call has been issued by a joint conference committee of the national societies of civil engineers, mining and metallurgical engineers, mechanical engineers and electrical engineers, and the action was taken pursuant to a resolution approving the movement adopted by a meeting of the governing boards of the four national societies named, together with those of the American Society for Testing Materials and also the trustees of the United Engineering Society and members of Engineering Council. The responsibility for perfecting a permanent organization rests, however, with the delegates to the conference.

A plan of organization has been drawn up by the joint conference committee upon the following principles:

1. Non-interference with the interrelations with respect to technical matters, and the maintenance of the autonomy, functions and operations, of individual organizations.
2. Local affiliation of existing groups of engineers in order to facilitate united action in local questions of public welfare and other matters of common interest.
3. National association of engineering organizations by means of a National Council composed of representatives widely chosen by local affiliations or organizations and by national organizations, meeting annually and acting through an executive board.
4. Financial support of such association by contributions from all participating organizations on a basis of membership.
5. A form of organization which will permit expansion and development.

Each organization will be entitled to one delegate for 100 to 1000 members and an additional delegate for each additional 1000 members or major fraction thereof.

Included in the membership of the joint conference committee are the following: Philip N. Moore, St. Louis; John W. V. Reynders, consulting engineer, New York; Dr. Joseph W. Richards, Lehigh University, Bethlehem, Pa.; Prof. L. P. Breckenridge, Yale University, New Haven; E. S. Carman, Osborn Mfg. Co., Cleveland; Prof. D. S. Kimball, Cornell University, Ithaca, N. Y., and L. C. Marburg, Marburg Brothers, New York.

Bonus Legislation Improbable

WASHINGTON, May 18.—Although the movement for soldiers' bonus legislation seemed at one time to have developed so much momentum that there would be little chance of heading it off, the probability now is that no measure of this sort can be enacted at this session of Congress.

If the soldiers' bonus bill fails to pass there will be no radical revenue legislation at the present session. The Ways and Means Committee is completing a bill for a revision of some of the administrative sections of the revenue law as a means of simplifying the procedure in the collection of taxes, along lines requested by the Treasury Department. This bill will not make any material changes in the present revenue law and probably will be passed without much difficulty.

CONTENTS

Iron and Steel Markets

OUTLOOK BRIGHTER

Signs of Early Cessation of Railroad Strike

Big Loss in Ore Movement—Accumulation of Finished Products

Reports indicate little improvement in the shipping situation, but hopeful signs, wanting a week ago, point to an early resumption of railroad traffic. The now apparent activity of the Railroad Labor Board, the expressed approval of railroad management of there being just claims for some wage advances and the emphatic declaration by the Federal Reserve Board of the intimate relationship of the transportation tie-up with the present credit situation are favorable factors.

With the immediate cessation of the strike it would take six to eight weeks to approach the operating pace of March. The present natural stagnation in business is not accompanied by any price softening as would normally occur under such a condition, for besides full order books, a slump in buying will be offset by the necessarily gradual resumption of the mills. It now appears that there are 1,300,000 tons of finished products in yards and warehouses in the Pittsburgh district alone, that the leading interest has probably 600,000 tons of unshipped material, and that in the whole country the undelivered manufactured steel is not far short of 2,000,000 tons.

Priority suggestions are not well received nor regarded as necessary. But car builders say that even if authorized in the next 30 days, it would take six months to turn out 100,000 railroad cars. This indicates that they do not expect to exceed 60 per cent of manufacturing capacity. At the present time they are operating at a 10 per cent rate, so low has been the volume of railroad equipment buying. Total car buying of the week does not exceed 1500 cars, nor do fresh inquiries.

In the return to normal the industry has the obstacle of insufficient labor, then the inadequate supply of rolling stock, a threatened fuel shortage all the while, and finally a limit to the quantity of ore for the year's operations.

Only half as much ore is being moved on the Lakes as there would ordinarily be, and likewise only half as much coal, and it is estimated that fully one month's ore movement has already been lost. It is not surprising that an advance of 10c. per ton in ore carrying charges was made in the week on moving 1,500,000 tons of ore, and it is believed that the $1.10 rate will now rule for the season, the 10 per cent increase in cost to be borne by the shipper.

Premiums are disappearing, partly because inability to make prompt shipments removes the chief reason for their being. Instances of better deliveries arise largely from a reduction in the number of points to which mills may ship, but full prices are obtained in these cases. Round lots of soft steel bars and also of reinforcing bars have sold at 4c. and 4.50c. per lb., Pittsburgh. An independent maker has put bars for agricultural implement makers at 3.50c.

Pittsburgh is operating at about 75 per cent of ingot capacity, while Youngstown is at less than 50 per cent. Shipments of semi-finished steel have been rather heavier in proportion to other forms than usual.

The National Tube Co. has been able thus far to ship 80 per cent of its output against 60 per cent in April, and it is operating its tube mills at about normal capacity.

The dullness of the pig iron market due to unwillingness of consumers to place orders when there is so much uncertainty as to delivery has not resulted in any weakness. In fact, at Pittsburgh the price of foundry iron is $1 higher, while basic has been marked up 50c. The lowest quotation on Virginia iron has disappeared and some Alabama iron has been sold at as high as $44, although the usual price prevailing is $42. Many foundries are having much difficulty in obtaining sufficient coke and iron to continue in operation.

Coke is $1 higher on both furnace and foundry grades, or $12 and $13 per ton respectively, while as high as $14 and $16 on furnace coke is reported.

Fabricated steel business of April, 122,500 tons, though the lowest of the four months of this year, was much above the average April bookings. The total amount of business done in the first four months of this year is greater than for the same period in any of the last 10 years, being even a little more than in 1916.

The upward trend of prices still obtains in Great Britain. The northeast coast makers have advanced steel 30s. per ton and coke is up 7s. 3d., or to $12, even at the current rate of exchange. Higher pig iron prices there are promised. The continuous price advances explains in part the persistence of British buyers to secure steel from Lorraine against orders placed in the summer of 1919. Present owners of the Lorraine works claim they are not bound by the old contracts based on fuel never delivered by Germany. Orders for 300,000 tons remain to be executed.

The April production of pig iron in Great Britain was 671,000 tons and steel ingots 794,000 tons, the figures in both cases representing the average so far this year. Among recent sales to England was 4000 tons of billets for June delivery at $75.

Pittsburgh

PITTSBURGH, May 18.

The local railroad strike situation is showing slow improvement, but it is believed that from this time on conditions will get better more rapidly. The chief trouble now is not so much the movement of freight as it is to get empty cars, all the railroads being short of empty cars, and not being able to spot these for shippers as fast as they would if conditions were normal. Thousands of tons of finished iron and steel products are being piled every day in warehouses or mill yards or loaded in cars, and in regard to the latter, the end of this has nearly been reached owing to the scarcity of cars. A conservative estimate is that close to 1,300,000 tons of finished products is piled in mill yards and warehouses in the Pittsburgh district alone. When the amount in the Youngstown, New Castle and Wheeling

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

	May 18, 1920	May 11, 1920	Apr. 20, 1920	May 20, 1919
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia‡	**$47.15**	$47.05	$47.05	$29.50
No. 2, Valley furnace†	**45.00**	44.00	43.00	26.75
No. 2, Southern, Cin'ti.†	45.60	45.60	43.60	29.35
No. 2, Birmingham, Ala.†	42.00	42.00	40.00	26.75
No. 2, furnace, Chicago*	43.00	43.00	43.00	26.75
Basic, del'd, East. Pa.	44.80	44.80	44.80	29.65
Basic, Valley furnace	**43.50**	43.00	43.00	25.75
Bessemer, Pittsburgh	43.90	43.90	43.90	29.35
Malleable, Chicago*	43.50	43.50	43.50	27.25
Malleable, Valley	44.00	44.00	43.00	27.25
Gray forge, Pittsburgh	43.40	43.40	42.40	27.15
L. S. charcoal, Chicago	57.50	57.50	57.50	38.85
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$45.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. billets, Pittsburgh	60.00	60.00	60.00	38.50
O.-h. sheet bars, P'gh.	80.00	80.00	80.00	42.00
Forging billets, base, P'gh.	80.00	80.00	80.00	51.00
O.-h. billets, Philadelphia	64.10	64.10	64.10	42.50
Wire rods, Pittsburgh	**75.00**	70.00	70.00	52.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.25	4.25	4.25	2.595
Iron bars, Pittsburgh	4.25	4.25	4.25	2.35
Iron bars, Chicago	3.75	3.75	3.75	2.50
Steel bars, Pittsburgh	*4.50*	3.75	3.75	2.35
Steel bars, New York	4.02	4.02	4.02	2.62
Tank plates, Pittsburgh	3.75	3.75	3.75	2.65
Tank plates, New York	4.02	4.02	4.02	2.92
Beams, etc., Pittsburgh	3.10	3.10	3.25	2.45
Beams, etc., New York	3.27	3.27	3.52	2.72
Skelp, grooved steel, P'gh.	2.75	2.75	2.75	2.45
Skelp, sheared steel, P'gh.	3.00	3.00	3.00	2.65
Steel hoops, Pittsburgh	5.00	5.00	5.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

	May 18, 1920	May 11, 1920	Apr. 20, 1920	May 20, 1919
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	5.50	5.50	5.50	4.35
Sheets, galv., No. 28, P'gh.	7.00	7.00	7.00	5.70
Sheets, blue an'l'd, 9 & 10.	4.50	4.50	4.50	3.55
Wire nails, Pittsburgh	4.00	4.00	4.00	3.25
Plain wire, Pittsburgh	3.50	3.50	3.50	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$37.00	$37.00	$37.00	$20.50
Carwheels, Philadelphia	40.00	40.00	40.00	20.00
Heavy steel scrap, P'gh.	25.00	25.00	25.00	14.50
Heavy steel scrap, Phila.	*23.00*	23.50	24.00	15.00
Heavy steel scrap, Ch'go.	*22.50*	23.00	23.50	15.25
No. 1 cast, Pittsburgh	32.00	32.00	32.00	17.00
No. 1 cast, Philadelphia	38.00	38.00	38.00	21.50
No. 1 cast, Ch'go (net ton)	*36.50*	37.50	37.00	19.50
No. 1 RR. wrot. Phila.	*33.00*	34.00	35.00	21.00
No. 1 RR. wrot. Ch'go (net)	*26.00*	26.50	27.00	15.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	**$12.00**	$11.00	$11.00	$3.75
Furnace coke, future	**12.00**	11.00	11.00	4.00
Foundry coke, prompt	**13.00**	12.00	11.00	4.50
Foundry coke, future	**13.00**	12.00	11.00	5.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.00	19.00	19.25	16.75
Electrolytic copper, N. Y.	19.00	19.00	19.00	16.50
Spelter, St. Louis	7.70	7.80	8.15	6.25
Spelter, New York	*8.05*	8.15	8.50	6.60
Lead, St. Louis	8.15	8.15	8.50	5.00
Lead, New York	8.50	8.50	8.85	5.25
Tin, New York	*54.75*	56.25	62.25	72.50
Antimony (Asiatic), N. Y.	*9.75*	10.00	11.00	7.75

The above prices are for domestic delivery and do not necessarily apply to export business.

districts is added to this, the grand total would no doubt be close to 2,000,000 tons. Every day that goes by shows a heavy increase in the stocks, the subsidiaries of the Steel Corporation alone having 600,000 tons or more. A leading independent steel company on Monday had 130,000 tons and a sheet and tin plate interest had about 80,000 tons. Every industrial concern in the Pittsburgh district is piling finished material for which cars cannot be had to ship it. The National Tube Co. is perhaps doing better than most of the other steel concerns here, having shipped so far this month about 80 per cent of its output, and all its tube mills are running nearly normal, while in April its shipments were only about 60 per cent of output. There is such a congestion of steel freight piled in the Pittsburgh district that if the strike were ended to-day, it would take at least two months to restore normal conditions. The appeal to Washington by steel companies' officials and traffic managers may result in the Interstate Commerce Commission taking some drastic action that will relieve the situation. Possibly the first thing it will do will be to declare an embargo on all but food products, food containers and other necessaries. There is very much dissatisfaction here over the failure of the Railroad Labor Board, appointed by President Wilson more than a month ago, to do something definite to better the situation.

Taking the three leading railroads in this district, the Pittsburgh & Lake Erie Railroad is not doing any switching and has no road service, and practically no empty cars. This road is hauling some full trainloads from plants along the line, but outside of this it is doing practically nothing. The Pennsylvania railroad conditions are a little better, but on account of some fatal accidents in the Pitcairn and Conway yards, about 30 college men who volunteered their services have quit at each of these yards. The Baltimore & Ohio is serving its shippers better than any other road here, except at Cleveland and other points in Ohio. The Bessemer & Lake Erie, owned and operated by the Carnegie Steel Co., claims it now has all the road crews it requires, and the road moved some ore and limestone on Monday. On the Erie and Lake Shore roads, progress is still being made in the Youngstown and New Castle districts, but these two roads have practically no empty cars. On Monday, May 17, the Pennsylvania Railroad moved 47,336 loaded cars in the Central Region, which runs from Altoona to Crestline, Ohio, against a movement of about 65,000 cars under normal conditions. In other words, this road handled on that day about 75 per cent of its normal freight movement.

The American Sheet & Tin Plate Co. has some voluntary crews working on engines and is able to move raw materials in, and finished sheets and tin plate out of some of its plants in the Farrell, Pa., district, in a fairly satisfactory way. This concern had on Monday 64 cars loaded with sheets and tin plate, but all were being held by embargoes. It is reported that some of the former switchmen have become tired of the strike and have returned to work. The failure to draw out the passenger engineers and firemen has discouraged the strikers to some extent. Some have expressed the opinion in the last few days that if they had it to do over again they would not have gone out on strike. It is to be hoped another week will see material improvement in the local railroad situation.

The amount of new business being done is very small, the mills not caring to take on more obligations on account of the freight congestion, and the consumers are not anxious to buy until the delivery situation is cleared up to some extent. Fairly good truck deliveries are being made by some steel mills to customers within

a radius of 40 miles of Pittsburgh proper, and this is helping out a good deal. There is bound to be a great shortage in the canning trade, as it is very evident that the can makers will not be able to get tin plate fast enough to make enough cans to take care of canning of fruit and vegetable crops. The fruit crop in this district this year promises to be very large, but the amount canned will not be as heavy as usual on account of the shortage in the supply of cans, also the shortage in the supply of sugar and the high prices ruling.

On last Saturday and Sunday railroads got their yards pretty well cleaned up by getting hundreds of loaded cars moved, and they promise that this will bring back empties in large numbers by the end of this week.

Pig Iron.—The local pig iron market is almost neglected, due to the railroad strike, only small lots of iron being sold and mostly for prompt shipment, when this can be done. The Carnegie Steel Co. has put another Columbus furnace on, and now has 35 going and 24 idle. Claire furnace of E. W. Mudge & Co., Sharpsville, Pa., started up on Tuesday after being down three or four weeks. The movement of coke and ore to the blast furnaces is better, and it is not believed that any more furnaces will have to close; in fact, some may start within a week or so that are now banked. We note a sale of 1000 tons or more of basic iron at $43.50, Valley furnace, the seller agreeing to make prompt shipment, also 500 tons of standard Bessemer iron to a local interest at $42.50, Valley furnace, and 600 to 800 tons of No. 2 foundry iron, silicon 1.75 to 2.25, at $45, Valley furnace. An inquiry is in this market for 12,000 tons of basic iron, 2000 tons a month over last half, but nothing has been done on it yet. Several producers say they will not quote on the inquiry, as they do not care to sell so far ahead under present unsettled conditions.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.40 per gross ton:

Basic	$43.50
Bessemer	42.50
Gray forge	42.00
No. 2 foundry	45.00
No. 3 foundry	43.50
Malleable	44.00

Billets and Sheet Bars.—Not much is being done in semi-finished steel in the way of sales. A sale is reported of 1000 tons or more of Bessemer sheet bars at less than $75 at mill, but open hearth bars are firm at $80 or higher. In fact, a sale of a considerable tonnage of open-hearth sheet bars is reported to have been made in the past week to a Detroit automobile dealer at about $90 at mill, the buyer to have these bars converted into sheets by a local interest. Production of ingots in the Pittsburgh district is now running at about 75 per cent, but in the Youngstown district it is less than 50 per cent, as the railroad strike is having very much worse effect on the mills there than in this district.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38 to $60; 2 x 2-in. billets, $42; Bessemer sheet bars, $42 to $70; open-hearth sheet bars, $42 to $80, and forging billets, ordinary carbons, $80 to $85 base, all f.o.b. Youngstown or Pittsburgh mill.

Ferroalloys.—The market is quiet, largely due to the railroad strike, but prices are ruling fairly firm. Domestic 76 to 80 per cent ferromanganese is firm at $250 for prompt, and $200 for last half shipment. We note sales of three or four cars at $250 delivered, shipment to be made by the furnaces when able to do so. Prices on 50 per cent ferrosilicon are only fairly strong, and it is said there is an over production of this material at present.

We quote 76 to 80 per cent domestic ferromanganese $200 for last half delivery and $250 for prompt delivery, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $80 to $85 and 18 to 22 per cent spiegeleisen at $70 to $75, furnace. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent, $56.50 to $57. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which has a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Structural Material.—Inquiry is very light, largely due to the railroad strike and general unsettled conditions. Fabricated material is piling up very fast in local shops, and several may have to close soon unless the strike is settled. The McClintic-Marshall Co. has taken 1000 tons for a tube mill building for the Steel & Tube Co. of America; the American Bridge Co., 350 tons for a factory building for the Buick Motor Co., Flint, Mich., and the Jones & Laughlin Steel Co. about 250 tons for a garage building for the Donaldson Transfer & Storage Co., this city. We quote beams and channels up to 15 in. at 2.45c., this being the price of the Carnegie Steel Co., while the other local interest is quoting 2.90c. to 3.25c. to regular customers only, and for such delivery as it can make. The Cambria Steel Co. is reported to be holding plain material firm at 4c., Pittsburgh.

Plates.—Some small car orders are coming out. The Pressed Steel Car Co. has taken 1200 hopper car bodies for the Baltimore & Ohio and 100 steel hoppers for the Union Gas & Electric Co., Cincinnati. The Standard Steel Car Co. has taken 500 steel hoppers for the International Harvester Co. The demand for plates is not as urgent as it was some time ago, and in spite of the material decrease in production, due to the railroad strike, prices on plates seem to be a little easier and the supply for fairly early delivery is somewhat better.

We quote sheared plates of tank quality, ¼-in. and heavier, at 2.65c. to 3c. for very indefinite delivery, while prices on ¼-in. and heavier plates, named by mills that will agree to ship out in three to four months, is 3.50c.

Sheets.—The American Sheet & Tin Plate Co. is operating this week to a little over 80 per cent of hot sheet mill capacity, while the independent mills are doing from 60 to 70 per cent. The worst shut-down of sheet mills is in the Youngstown and Niles, Ohio, districts, which have been very badly affected by the railroad strike. Shipments of sheet bars to mills in certain localities were better last week than at any time since the railroad strike started. Some independent mills are showing a strong tendency to get closer to the prices of the leading interest than for some time.

We quote No. 28 gage box annealed one-pass black sheets at 4.35c. to 6.50c.; No. 28 galvanized, 5.70c. to 8.50c., and Nos. 9 and 10 blue annealed at 3.55c. to 6c., the lower prices named being the March 21 schedules, which are still named by the leading interests, while the higher prices represent a fair range of quotations by the independent mills.

Tin Plate.—This week the American Sheet & Tin Plate Co. is operating close to 45 per cent of hot tin mill capacity, but is still unable to get an adequate supply of sheet bars to some of its more important works. The McKeesport Tin Plate Co., which has 44 hot tin mills, is again in operation, after being closed about five weeks on account of the railroad strike. Some independent tin mills are running at about 100 per cent, but will soon have to slacken down or else stop entirely, if the railroad strike is not settled, as they have about reached the limit of storage capacity. The Americen Sheet & Tin Plate Co. alone has over 80,000 tons of sheets and tin plate stored in warehouses or loaded on cars, which are not being moved, as very few empties are being obtained. Most of the leading can makers are covered on their supply of tin plate at the regular price of $7 per base box, but other consumers that do not make food containers have paid from $8 to $9 per base box.

We now quote tin plate to domestic consumers for remainder of the year delivery at $7 to $8.50 base box, stock items $9, and for export $11 to $12 per base box, all f.o.b. Pittsburgh.

Steel Rails.—Both the Carnegie Steel Co. and the Cambria Steel Co., the latter rolling only light rails, are well sold up over the remainder of the year. Makers of re-rolled rails report an active demand and say they are getting practically the same prices for re-rolled rails as the makers of rails rolled from billets are obtaining. The Carnegie Steel Co. is still quoting the March 21 prices, these being 2.45c. for 25 to 45 lb. sections, 2.49½c. for 16 lb. and 20 lb. sections, 2.54c. for 12 lb. and 14 lb. sections, and 2.58½c. for 8 lb. and 10 lb. sections. This company is also quoting standard sections 50 lb. and heavier at $45 for Bessemer and $47 for open hearth stock. The Cambria Steel Co. is quoting

25-lb. to 45-lb. sections at 3.75c., 16-lb. and 20-lb. sections, 4.75c., and 12-lb. and 14-lb., 9.50c. at mill, for such delivery as it can make.

Wire Rods.—Two local makers report that on one day recently they received inquiries for close to 25,000 tons of rods, but quoted on only a very small part of this tonnage and to regular customers only. Prices on rods are higher, due to the railroad strike. We quote soft Bessemer and open hearth rods at $75, screw stock rods $80 to $85, and high carbon rods $85 to $100 at mill.

Wire Products.—Local makers of wire and wire nails say they are selling only in very limited quantities, to regular customers only, and for such delivery as they can make, due to the railroad strike. The American Steel & Wire Co. is still adhering to the March 21 schedule, which is $3.25 base on wire nails, and $3 base on bright basic wire. Independent mills are quoting $4 base on wire nails, extras as per the new card, and one mill is quoting $3.60 on cement coated nails, extras as per the old card, while two or three independent mills are quoting cement coated nails at $3.35, extras as per the new card, on which the extras are about 25c. higher than on the old card. Prices on general wire products are given in detail on page 1481.

We quote wire nails at $3.25 base, this being the price of the American Steel & Wire Co., and $4 base on the new card recently issued by four or five of the independent mills. We quote bright basic wire at $3, this being the price of the American Steel & Wire Co., and $3.50, this being the price of most of the independent mills.

Iron and Steel Bars.—There has been a very heavy decrease in production of steel bars, due to the railroad strike. The Carnegie Steel Co. recently closed its Youngstown and McDonald, Ohio, bar mills, and is doing practically nothing in its Upper and Lower Union mills in this city. Its largest production in bars at present is at the Duquesne Steel Works; the Jones & Laughlin Steel Co. and Cambria Steel Co. so far have not been materially affected by the railroad strike. The two local makers of iron bars are still operating, but are making very few shipments.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 3.50c. at mill, prices depending entirely on the buyer and the delivery wanted. The demand for concrete reinforcing steel bars is fairly active, and we quote these, when rolled from billets, at 4c. to 4.25c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.25c. to 4.50c. and refined iron bars at 4.50c. to 5c. in carloads, f.o.b. mill, Pittsburgh.

Cold Rolled Steel Bars.—Fairly heavy shipments of cold rolled bars are still going to automobile builders in Detroit, Toledo and other places by truck from makers in this district, and there have recently been some full trainload shipments to these points. We continue to quote cold-rolled steel bars at $4.10 to $4.25 to regular customers only f.o.b. at mill, for such delivery as producers can make. Premium prices have lowered recently, and now range from 5c. to 7c. at mill, in small lots, for fairly prompt shipment.

Hot-Rolled Strip Steel.—Deliveries are still going through to leading automobile builders by truck and in some cases by freight, but stocks piled in mill warehouses are getting heavier right along. Two leading local makers are still holding hot-rolled strips at 5½c. per lb. at mill, to regular customers only, and are not selling above or below that price. Premium prices are disappearing to some extent, and now range from 6½c. to 8c. at mill, depending on the quantity wanted and the delivery.

Cold-Rolled Strip Steel.—The minimum price on this product is 8½c. per lb. at mill, to regular customers, for shipment at convenience of the maker. Deliveries are still being made by truck to large consumers at Detroit, Toledo, and other places; in all cases the buyer paying the heavy truck charges.

Nuts, Bolts and Rivets.—A local maker of nuts and bolts reports he has not made a full carload shipment for over a month, and has not received a full carload of steel bars in the same time. Local makers are sold up for some months, and are quoting only to regular customers for such deliveries as they can make. Prices on rivets in large lots, and discounts on nuts and bolts, are given on page 1481.

Spikes.—An Eastern road has bought about 1000 kegs, and another road 600 kegs of standard spikes at $4 base, per 100 lb., for delivery at convenience of the maker. Railroads have pretty well covered their needs of spikes for this year and buying has been light for some time. One local maker reports having three to four months work ahead.

We quote standard spikes, ½ to 9/16 in. and larger, $4 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅝ in. and 7/16 in., $4.50; 5/16 in., $5; boat and barge spikes, $4.25 f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Boiler Tubes.—Local mills report a very heavy demand for seamless and stationary tubes, and shipments in the past week were better than at any time since the railroad strike started. However, a good part of production is still being piled. Discounts on iron and steel tubes are given on page 1481.

Iron and Steel Pipe.—The National Tube Co. is operating all its tube mills at about normal capacity, and so far this month its shipments have been about 80 per cent of production, as against a general average in April of a little over 60 per cent. The Jones & Laughlin Steel Co. is operating its tube mills at Woodlawn, Pa., full time, and has been able to get some full trainload shipments through. The demand for iron and steel pipe, and also for oil well tubular goods, is still active, but not so heavy as some time ago. The pipe mills of Republic Iron & Steel Co. and Youngstown Sheet & Tube Co. at Youngstown, Ohio, also the Wheeling Steel & Iron Co., Wheeling, are doing very little. Discounts on iron and steel pipe are given on page 1481.

Coke.—There is a better movement of coke from the Connellsville region to blast furnaces in the past week than at any time since the railroad strike started. There was a general cleaning up of loaded cars in the coke regions on Saturday and Sunday, and a very large amount of coke went through to destination. The H. C. Frick Coke Co., with its individual cars, is giving good service between certain points in the Lower Connellsville district and its Monongahela River loading station. The demand for prompt furnace coke is urgent, but very little is being shipped, as empty cars are very hard to obtain. Output of coke in the Upper and Lower Connellsville regions last week was 170,100 tons, a decrease from the previous week of 6600 tons. We note one sale of 30 cars and another of 55 cars of standard furnace coke, for prompt delivery, at $12 per net ton at furnace, and reports are that $13 has been done. We now quote standard grades of blast furnace coke at $12 to $13 for prompt shipment, and 72 hr. foundry at $13 to $14 per net ton at oven.

Old Material.—Local dealers say they could readily sell selected heavy steel melting scrap at $25 per gross ton, delivered to consumers' mills, for shipment when the railroad strike is ended, but claim they do not care to do business at that price, as they believe values on all grades of scrap will be higher when the strike is over. One local dealer reports that his shipments of scrap last week were very much the heaviest in any one week since the strike started. Not enough business is being done in scrap in this market to determine actual prices, and quotations given below are largely nominal.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$25.00 to $25.50
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	32.00 to 33.00
Compressed steel	22.00 to 22.50
Bundled, sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	16.00 to 16.50
Bundled, sheet stamping	15.00 to 15.50
No. 1 busheling	17.50 to 18.00
Railroad grate bars	26.00 to 26.50
Low phos. melting stock (bloom and billet ends, heavy plates) ¾ in. and heavier	30.00 to 30.50
Railroad malleable	30.00 to 30.50
Iron car axles	37.00 to 38.00
Locomotive axles, steel	34.00 to 35.00
Steel car axles	31.00 to 32.00
Cast iron wheels	40.00 to 41.00
Rolled steel wheels	29.00 to 30.00
Machine-shop turnings	15.50 to 16.00
Sheet bar crop ends (at origin)	28.00 to 28.50
Heavy steel axle turnings	30.00 to 31.00
Heavy breakable cast	32.00 to 32.50
Cast iron borings	17.50 to 18.00
No. 1 railroad wrought	31.00 to 32.00

Chicago

CHICAGO, May 18.

Reports of improvement in the transportation situation are balanced by reports of less satisfactory rail service. On the whole, conditions here have changed but little since a week ago. The leading interest is operating on about the same basis as seven days ago, while the foremost independent is not doing so well. Other producers are maintaining approximately the same rate of operation as previously reported. Although conditions have not grown worse, the cumulative effect of more than a month and a half of acute transportation difficulties resulting from the switchmen's strike is becoming increasingly evident. While it cannot be said that either mills or consumers are relaxing their efforts to overcome the difficulties confronting them, market activity is at a low ebb. Nevertheless, the prospect of an early settlement of the strike by the Railroad Wage Board, now in session here, lends weight to the hope that the worst is over and that from now on a return to normal conditions will be in order. At the same time, it is realized that weeks and perhaps months will be required to dispose of the present freight congestion. It is furthermore recognized that the shortage of railroad equipment will continue to impede industrial activity until the carriers provide themselves with an ample supply of cars. The switchmen's strike seemingly has crystallized sentiment in favor of prompt and concerted pressure by the business interests of the country to the end that the railroads shall be assisted in financing and securing material for equipment.

In Chicago most of the jobbing foundries are still tied up by a molders' strike and in North Chicago and Waukegan similiar trouble has been encountered.

Ferroalloys.—The leading northern merchant iron producer expects to put in a furnace on ferromanganese this week. It will offer the output at $250 for prompt shipment and $200 for last half delivery. There has been little activity in the ferroalloy market, the only sales being a carload or two of ferromanganese for spot delivery at $235, delivered. Spiegeleisen has sagged to $70, furnace.

We quote 75 to 80 per cent ferromanganese, last half, delivered, $200; spot, delivered, $235; 50 per cent ferrosilicon at $85 delivered; spiegeleisen, 18 to 22 per cent, $70 furnace.

Pig Iron.—The market is quiet, but a fair amount of spot business is uncovered when it is drummed up and here and there a good sized order is closed. Increased activity is expected if the railroad strike is settled as a result of the deliberations of the Railroad Wage Board now in session in this city. Locally, of course, the molders' strike will continue to affect the market, but in other sections of this district it is believed that buying in good volume will develop. Recent sales include 1000 tons of southern foundry for prompt shipment, which brought $42, base Birmingham, 300 tons for early delivery closed on the same basis; 600 tons of southern foundry for last half delivery and 250 tons for prompt shipment, also contracted for at $42 base. A number of southern producers continue to quote $44, Birmingham, but so far as is known only one sale of any size, involving about 350 tons, has been made at that price in this district.

Although the foremost northern producer has nothing to offer for the remainder of the year, two 500-ton lots of northern foundry were recently purchased at $45 base, Chicago. On the whole, prices are irregular and will probably not stabilize until the present transportation troubles are over. Certain outside furnaces are asking for permission to anticipate last half shipments, but the usual inferences as to the reasons for such a move may not be properly drawn at this time. Southern quotations on foundry range all the way from $42 to $45 base, Birmingham, and some iron slightly low in manganese has been offered for May and June shipment at $41. Jackson County silvery furnaces have advanced prices half a dollar a ton. The leading producer of foundry coke in this district is maintaining the output of a week ago, although its plant at Joliet is now giving its production to the Peoples' Gas Light & Coke Co. of this city, the coke supply of which was running dangerously low. Eastern bee-hive coke is commanding as high as $16 oven on early shipments. It is difficult to obtain, although it is said that $16 coke is moving with surprising celerity as compared with coke purchased at lower prices.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, averaging sil. 1.50 (other grades subject to usual differentials), deliv. at Chicago...	$57.50
Northern coke, No. 1 sil. 2.25 to 2.75.	45.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25.....	43.00
Northern high phos. foundry.....	43.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25.....	50.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75.....	48.70
Southern foundry, sil. 1.75 to 2.25..	47.00
Malleable, not over 2.25 sil.....	43.50
Basic	42.00
Low phos. (copper free).....	54.00
Silvery, 7 per cent.....$56.40 to	59.80

Railroad Rolling Stock.—The Southern Pacific has ordered 500 automobile cars from the Standard Steel Car Co. The Bethlehem Steel Co. has purchased 1000 gondola cars of 70 tons capacity from the Cambria Steel Co. The Pullman Co. will construct 500 ore cars for the Chicago & Northwestern. The New York Municipal Railways have ordered 100 subway cars from the Pressed Steel Car Co. The Pennsylvania Tank Car Co. is in the market for 400 tank cars and the Standard Oil Co. of Indiana wants 150 hopper cars. The latter company has purchased six 40-ton gondola cars. The Virginian Railroad is inquiring for 10 coaches, four baggage and mail cars ond one club car.

Plates—For 250 general service cars to be built by the Mt. Vernon Car Mfg. Co. for the Southern Pacific, the leading interest will furnish 4000 tons of plates and shapes. The same mill will supply 5150 tons of steel, including axles, to the Standard Steel Car Co. for the construction of 500 automobile cars for the Southern Pacific, and 4350 tons to the Pullman Co. for 500 ore cars to be built for the Chicago & Northwestern. The foremost interest will also furnish 3000 tons of plates and shapes to the Southern Pacific for the construction of 2000 freight cars in its Sacramento and Los Angeles shops. On the whole, the market in plates is quiet.

The mill quotation is 2.65c. to 4c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.17c. for plates out of stock.

Structural Material.—One of the few large structures which fabricators have been figuring on, namely, the Grauman theater and office building, San Francisco, estimated as requiring 2350 tons of steel, will be constructed of reinforced concrete, according to late advices. Another good-sized project, the proposed warehouse and office building of the Standard Oil Co. at Milwaukee, involving 1100 tons, has been indefinitely postponed, although the foundations now under way will be completed. The largest fabricating award of the week calls for 340 tons which will be supplied by the Milwaukee Bridge Co. to the Evinrude Motor Co., Milwaukee, for a foundry and machine shop. Few new inquiries are appearing, the only one of note this week being 500 tons for a warehouse to be erected at Dallas, Texas, by Sears, Roebuck & Co. Owing to the transportation situation, the demand for plain material is off. Recent fabricating awards include:

Waterloo, Iowa, high school, 291 tons, to Rock Island Bridge & Iron Works.

McCormick Theater, Dearborn and Randolph streets, Chicago, 250 tons, to Fred S. Fragel & Co., Columbus, Ohio.

Orpheum Theater, Cleveland, 178 tons, to Toledo Bridge & Crane Co.

Hibbing, Minn., high school, 154 tons, to American Bridge Co.

Lavine Gear Co., machine shop addition, Milwaukee, 115 tons, to Milwaukee Structural Steel Co.

The mill quotation is 2.45c. to 4c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.97c. for materials out of warehouse.

Bars.—While the demand has been affected by the transportation situation, inquiry for bars is heavier than for most other iron and steel products. Neither

of the leading local producers of mild steel bars has anything to offer and eastern sources of supply are now uncertain because of the railroad strike. One large independent, however, is offering bar size angles at 3.75c. to 4c., Pittsburgh, with delivery dependent on railroad developments. This size of angle has been particularly difficult to obtain in recent months. Bar iron and rail-carbon steel bar mills in this district are accepting little additional tonnage, although inquiry is still in fair volume. One iron bar producer is no longer taking orders in lighter sizes, having discovered that a charge of ¼c. premium did not discourage the placing of business. Both bar iron and hard steel bar mills have exceptionally heavy bookings in the smaller sizes.

Mill prices are: Mild steel bars, 2.35c. to 4c., Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.75c., Chicago; rail carbon, 3.75c., mill.

Jobbers quote 3.87c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.80c. for rounds and 6.30c. for flats and squares, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra of 35c. for orders up to 1000 lb.

Sheets.—The basis on which the leading independent allocated its third quarter output indicates a trend toward a more stable level between the Steel Corporation prices and the premiums which some sellers have succeeded in commanding for several months. The prices at which the allotments were made were 5.27c. to 5.77c., f.o.b. Chicago, for No. 10 blue annealed; 6.27c. to 6.77c., Chicago, for No. 28 gage black; and 7.77c. to 8.27c., Chicago, for No. 28 gage galvanized.

Mill quotations are 4.35c. to 6.50c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.75c. to 8.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. The lowest prices are those of March 21.

Jobbers quote, Chicago delivery out of stock, No. 10 blue annealed, 7.02c.; No. 28 black, 8c.; No. 28 galvanized, 9.50c.

Wire Products.—With the transportation situation practically unchanged, the problem of moving shipments is still uppermost in the minds of both mill and buyer. The report that the railroads will adopt priority regulations giving perishables and fuel precedence over all other freight is a source of some concern. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1481.

Rails and Track Supplies.—On a Western inquiry for 6000 tons of standard section open-hearth rails, an Eastern independent quoted $65, mill, with fairly good delivery. The local mill continues to take moderate tonnages in light rails and limited additional commitments in track fastenings.

Standard Bessemer rails, $45 to $55; open hearth rails, $47 to $57. Light rails, 2.45c. to 3.50c. f.o.b. makers' mills. Standard railroad spikes, 3.55c. to 4c., Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c. f.o.b. makers' mills.

Cast Iron Pipe.—The market is dull and prices are unchanged.

We quote per net ton f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $79.80; 6-in., and above, $76.80; class A and gas pipe, $2 extra.

Bolts and Nuts.—Bolt and nut production continues to decline because of the non-delivery of raw material, particularly small stock. Sellers fear that the shortage of nuts and bolts may seriously affect important manufacturing industries, such as the automotive and farm implement plants. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1481.

Jobbers quote structural rivets, 5.37c.; boiler rivets, 5.47c.; machine bolts up to ⅞ x 4 in., 30 per cent off; larger sizes 20 off; carriage bolts up to ⅞ x 6 in., 20 off; larger sizes, 15 off; hot pressed nuts, square tapped and hexagon tapped, 50c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras are unchanged.

Old Material.—The market is quiet, but such transactions as have been closed indicate softer prices. A good-sized tonnage of railroad malleable was bought by a consumer at about $26.25 to $26.75 per net ton. Five hundred tons of cast scrap brought $37.50 per net ton and a 2000-ton lot was purchased at about $1 less. A sale of 1000 tons of stove plate was closed at $30 per net ton. Heavy melting steel is weak, borings and turnings are marketless, and rolling mill grades are soft. The only railroad offering is 2000 tons advertised by the Chesapeake & Ohio.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$34.00 to	$35.00
Relaying rails	45.00 to	55.00
Car wheels	37.00 to	38.00
Steel rails, rerolling	31.50 to	32.00
Steel rails, less than 3 ft.	28.00 to	28.50
Heavy melting steel	22.50 to	23.00
Frogs, switches and guards, cut part	22.50 to	23.00
Shoveling steel	22.00 to	22.50
Low phos. heavy melting steel	28.00 to	28.50
Drop forge flashings	18.00 to	19.00
	Per Net Ton	
Iron angles and splice bars	$30.50 to	$31.50
Steel angle bars	23.00 to	23.50
Iron arch bars and transoms	31.50 to	32.50
Iron car axles	49.00 to	40.00
Steel car axles	32.50 to	33.50
No. 1 busheling	19.00 to	20.00
No. 2 busheling	13.50 to	14.50
Cut forge	24.00 to	24.50
Pipes and flues	15.50 to	16.00
No. 1 railroad wrought	26.00 to	26.50
No. 2 railroad wrought	24.00 to	24.50
Steel knuckles and couplers	22.50 to	23.00
Coil springs	25.00 to	25.50
No. 1 cast	36.50 to	37.50
Boiler punchings	24.00 to	24.50
Locomotive tires, smooth	23.00 to	23.50
Machine shop turnings	10.00 to	10.50
Cast borings	12.00 to	12.50
Stove plate	30.00 to	30.50
Grate bars	29.00 to	29.50
Brake shoes	25.50 to	26.00
Railroad malleable	26.25 to	26.75
Agricultural malleable	25.75 to	26.25
Country mixed	17.00 to	18.00

Buffalo

BUFFALO, May 17.

Pig Iron.—Very little iron has been sold during the past week in this district. There has been great loss of production due to strikes, dating back from the steel strike last September. From that time on the history of the iron and steel industry in this district has been a series of setbacks, until furnaces which would normally be able to sell last half iron at this time in fairly good-sized quantities, find themselves unable to quote. The total sales of foundry iron of all grades did not exceed 2000 tons at the most last week, it is believed, and probably ran somewhat less than that figure. In addition to this, a small lot of basic—100 tons—was sold. This brought $47 and was part of an export inquiry placed before the market recently for 1,000 tons. The urgency of it is seen in the selling price, $3 to $4 above the ordinary market price. The highest price recorded in this market for No. 1 foundry for delivery over the last half was a small tonnage of 2.75 to 3.25 which brought $53. Some furnaces, represented by a sales agency in Buffalo, which have been actively in the market, have been compelled to withdraw definitely through labor troubles. Shipping is extremely difficult, with embargoes against New England, New Jersey and New York points. It is necessary to obtain permits to ship to these points and then to obtain cars. Box cars are not to be had.

We quote f.o.b. Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$48.00
No. 2X foundry, 2.25 to 2.75 sil.	46.25
No. 2 plain, 1.75 to 2.25 sil.	45.00
Basic	$44.00 to 45.00
Malleable	46.25
Lake Superior charcoal	58.00 to 60.00

Finished Iron and Steel.—Mills are absorbed in the problem of operation and shipping material. The second unauthorized switchmen's strike which has now been in effect since April 30 is seriously hampering operations, both in the intake of supplies and the shipment of finished material. The situation during the latter part of the week cleared somewhat so far as the mills are concerned, and conditions were better than at any time since the second strike was called. Railroads are probably working an average of 40 per cent, but mills have overcome the situation partially by resorting to trainload shipments of material, which are classified at the mill yards and drawn to main lines beyond the strike zones, where they are picked up by through trains. Mills seem to be reasonably well fixed so far as coal is concerned, and though the supply of empties has been bad right along, this now shows a hopeful improvement. The demand has subsided slightly, though the market is still strong and prices are

firm, whether the figures quoted by the leading interest, the conservative independents or the high independents are considered. The strike has had the effect of checking the inquiry somewhat on plates and shapes though the demand for bars continues very heavy. Mills will book little except for very urgent needs. In these instances they examine specifications, eliminate sizes that do not fit into their schedules and stipulate that delivery is entirely contingent on strike conditions. Demand from Canada continues in about the same ratio as the domestic demand. Canada, sales agencies in Buffalo report, has its share of labor difficulties. One large Hamilton, Ont., steel plant recently had to close down the entire portion of its plant that is steam-operated, when steam engineers went on strike. Prices remain the same with the leading interest adhering to its March, 1919, schedule.

The A. E. Baxter Engineering Co. is working on plans for the construction of an elevator and flour mill for the Hecker-Jones-Jewell Co. to have the largest milling capacity on the Great Lakes. The mill will be in two units, each 132 x 1150 ft., nine stories, and will have a capacity of 25,000 barrels a day. The elevator will be in two units and will have a capacity of 3,000,000 bushels in each unit. The general contract has not been let.

Jobbers quote the following prices for this territory: Steel bars, 4.61c.; iron bars, 5.26c.; structurals, 4.46c.; plates, 4.66c.; No. 10 blue annealed sheets, 6.51c.; No. 28 black sheets, 8.25c.; No. 28 galvanized sheets, 9.50c.; bands, 5.81c.; hoops, 6.06c.; cold rolled steel, 6.00c.

Old Material.—Dealers are still up against a shortage of cars due to the switchmen's strike. So irregular are supplies of cars that dealers cannot make any promises of delivery. Despite the poor transportation facilities and the difficulty of getting any sort of shipments through, there is some business being placed by mills with the stipulation that it will be delivered when it is possible to obtain cars to move it. There has been very little scrap sold in the past month, up to this demand of the last few days. There is a real shortage of scrap due to lack of foundry production. Prices are down slightly, but nominal.

We quote dealers' prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel, regular grades	$24.50 to $25.50
Low phos., 0.04 and under	31.50 to 32.50
No. 1 railroad wrought	30.50 to 31.50
No. 1 machinery cast	37.50 to 38.50
Iron axles	39.00
Steel axles	39.00
Car wheels	37.00 to 38.00
Railroad malleable	30.50 to 31.50
Machine-shop turnings	16.00 to 16.50
Heavy axle turnings	19.50 to 20.50
Clean cast borings	16.50 to 17.50
Iron rail	29.50 to 30.50
Locomotive grate bars	23.50 to 24.50
Stove plate	31.50 to 32.50
Wrought pipe	20.50 to 21.50
No. 1 busheling	19.50 to 20.50
Bundled sheet stamping	16.50 to 17.50

Birmingham

BIRMINGHAM, May 17.

Pig Iron.—Birmingham furnace operators appeared less desirous of further rise in price during the past week than in some time. Satisfied that a safe minimum of $42 had been established for the unsold capacity of the last half of the year, they have been booking on that level with practical uniformity. Due regard for the freight rate to points of destination in competitive territory may have something to do with this. Smaller operators and brokers incline to $43 and $44 for spot delivery and frequently get those prices. The Tennessee company announces the blowing in of a Bessemer stack on foundry in the immediate future, but it is also understood that this additional capacity is to care for orders already booked. There is little prospect of any early $38 flurries. Situation of some furnaces with regard to coke supply is becoming serious owing to car shortage at mines. Woodward and Sloss-Sheffield continue to divide the major portion of the product of the Alabama By-Products Co. and the Alabama Co. gets Semet-Solvay by-product coke. The Sloss-Sheffield Steel & Iron Co. appears to be in good shape for operations. During the week it blew in a city stack recently relined, giving it five active foundry furnaces. This and other large foundry producers have been making daily sales over the Middle West and the East as well as South. The aggregate has been considerable. Several southern lots of 1000 tons for early delivery were booked. The May Alabama output will probably be the largest of the year, but movements out of yards continue to be so heavy that stocks will decline to a negligible tonnage. A small tonnage for Italian delivery was booked.

We quote per gross ton, f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sil. 1.75 to 2.25	$42.00 to $44.00
Basic	41.00 to 43.00
Charcoal	55.00

Cast Iron Pipe.—Water and gas pipe orders from southern municipalities continue to come in with regularity, the small sizes of water pipe predominating. Prices remain at $73 for 4 in. and $70 for 6 in. and upward.

Coal and Coke.—Alabama production remains at about 320,000 tons per week. The average deficiency in production of mines on the Southern Railway is 52 per cent. Following this and cost of overhead, prices have been raised $1 per ton. Coke is acutely scarce and prices for 72-hr. run from $11 to $12.50 per ton. Spot coke is an almost unknown quantity. Illinois foundries have vainly sought Alabama coke. Some has moved to St. Louis.

Old Material.—The scrap market is listless, especially as to heavy steel. Consumers have notified yardmen that they are not in the market for immediate shipment. Prices are unchanged.

We quote per gross ton, f.o.b. Birmingham district yards prices to consumers, as follows:

Steel rails	$21.00 to $22.00
No. 1 steel	19.00 to 20.00
Cast iron borings	14.00 to 15.00
Machine shop turnings	14.00 to 15.00
No. 1 cast	34.00 to 35.00
Car wheels	32.00 to 33.00
Tramcar wheels	31.00 to 32.00
Steel axles	29.00 to 30.00
No. 1 wrought	26.00 to 27.00

Cincinnati

CINCINNATI, May 18.

Pig Iron.—Sales in this territory have been confined mostly to small lots of spot iron to melters who are unable, owing to transportation conditions, to get shipments. There is very little inquiry before the market, the largest being for 500 tons for a Kentucky melter. We note the sale of 1000 tons of southern foundry to a melter in this territory for shipment during the second half at the base price of $42, Birmingham; also a 750-ton lot to a central Ohio foundry at the same figure. Another sale of 850 tons of southern Ohio malleable is reported to a Chicago melter at $46.25. This makes a total of 2700 tons taken by this melter during the past three weeks. Some iron from southern Ohio furnaces was disposed of during the week at the $45 price for the base grade, and 300 tons of Virginia was taken by a nearby foundry at $44. Jackson County silvery is firm at $58 for 8 per cent, with two furnaces asking a premium of $1.50 for prompt shipment. A report that a southern furnace had offered about 5000 tons of foundry iron for early shipment at $41 has been in circulation here, but is not confirmed. Foundries in this territory are still running up to capacity, their greatest difficulty being in securing sufficient fuel.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	46.85
Ohio silvery, 8 per cent sil.	59.80
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	46.80
Basic Northern	41.80
Malleable	$45.80 to 46.80

Coke.—The coke situation shows some improvement. Sellers report that they have assurances that at least part of their coke is now moving from the Connellsville field, and one interest reports that it was able to furnish 15 cars to concerns in this district during the week. Coke for prompt shipment is being quoted as high as $16, and sales have been made during the week

at $15.50. For last half shipment $12 is quoted for Connellsville. New River and Wise County coke are still being quoted at $13.

Finished Material.—Conditions in the finished steel market show no change during the week. Sheet mills in this territory are still running up to capacity, and as the railroads are not affected to the same extent as in other parts of the country, are able to ship most of their output. There is still a heavy demand for all finished products, but a slight hesitancy is noted in placing orders for third and fourth quarter. Cold-rolled strip steel and screw stock are in particularly short supply, and a local broker has disposed of a fairly large quantity of strip steel at 15½c. Some mills in this territory are now quoting black sheets at 8.50c. and galvanized at 9.75c. and are able to make very good delivery. Scarcity of box cars for shipping sheets and wire products is so acute and the shortage of these items so great, that consumers are perfectly willing to take all risks of damage in transit, and are asking mills to ship in open cars when they are available. As one sales manager said, it seems to be a case of getting the material or closing down, and as a result the consumer is willing to take any chances as long as he can keep running. Jobbers report business good, particularly in bars, bands, sheets and wire products. Prices on black and galvanized sheets have been advanced slightly during the week, No. 28 gage black sheets now being quoted at 9c., and No. 28 galvanized at 10.15c. Outside these two items, prices remain the same as last week. No structural awards have been made in this territory, but a number of projects, involving a considerable tonnage, are being held up on account of the difficulty of securing the necessary money to finance them at reasonable rates.

Jobbers quote: Iron and steel bars, 5c. to 6c.; structural shapes, 5.10c.; plates, 5c.; steel bands, 6.25c. base; No. 10 blue annealed, 7.50c.; No. 28 black sheets, 9c.; No. 28 galvanized sheets, 10c. to 15c.

Old Material.—The scrap market remains dull and listless. Dealers are taking in small quantities of scrap where it can be moved, but owing to the fact that nearly every steel producing center is embargoed, no large sales are reported. Dealers expect higher prices when transportation conditions improve, and are well satisfied to mark time in the meanwhile. The machinists' strike, which has affected a number of shops in this city, will have a tendency to make borings and turnings scarcer, and better prices for those two items are looked for. In the absence of trading prices quoted are nominal.

	Per Gross Ton	
Bundled sheets	$16.00 to	$17.00
Old iron rails	27.00 to	28.00
Relaying rails, 50 lb. and up	48.00 to	49.00
Rerolling steel rails	29.00 to	30.00
Heavy melting steel	21.50 to	22.50
Steel rails for melting	24.00 to	25.00
Car wheels	29.00 to	30.00
	Per Net Ton	
No. 1 railroad wrought	$25.00 to	$26.00
Cast borings	11.50 to	12.00
Steel turnings	9.50 to	10.00
Railroad cast	31.00 to	32.00
No. 1 machinery	35.00 to	36.00
Burnt scrap	22.00 to	23.00
Iron axles	29.50 to	30.00
Locomotive tires (smooth inside)	23.50 to	24.50
Pipes and flues	17.00 to	17.50
Malleable cast	22.00 to	22.50
Railroad tank and sheet	16.00 to	16.50

New York

NEW YORK, May 18.

Pig Iron.—Sales of several thousand tons of iron for various foreign countries have been made, but it is doubtful whether under present railroad conditions shipments will be possible for some time. The railroad situation shows a little improvement, as a limited tonnage can now be moved over the Pennsylvania, the New Haven and also the Lackawanna railroads. The relief, however, is so slight that it is hardly appreciable. In fact, at the present time many foundries are having difficulty in keeping in operation. The same is true as to conditions in New England. Naturally there is practically no inquiry and the market is at a stand-still. Prices continue firm. The furnace which has been making the lowest quotation on Virginia iron, $43.25, furnace, is now out of the market and $44 is believed to be the lowest price obtainable. A limited tonnage of eastern Pennsylvania iron has been sold on a basis of $47, but other sales at $45 are reported.

We quote for delivery in New York as follows:

East. Pa., No. 1 fdy., sil. 2.75 to 3.25	$50.05 to	$51.05
East. Pa., No. 2 X fdy., sil. 2.25 to 2.75	49.05 to	50.05
East. Pa., No. 2 fdy., sil. 1.75 to 2.25	47.80 to	48.80
Buffalo, sil. 1.75 to 2.25	47.90 to	48.90
No. 2 X Virginia, sil. 2.25 to 2.75		49.60

Ferroalloys.—The transportation situation is such that some consumers of ferromanganese are putting out insistent demands for shipment of the alloy on contract. Otherwise the market is quiet but very strong with the domestic alloy quoted at $200, delivered, for the last half, with some British alloy available at $195, seaboard, for shipment from August on. For delivery before July 1 at least $250, delivered, can be obtained for such domestic alloy as is available, with a small amount of British offered at $225, seaboard. It develops that one large producer will put in blast very soon a furnace which is expected to produce 2500 tons of ferromanganese per month and also another furnace in July with a capacity of 2000 tons per month. Unconfirmed rumors are to the effect that two large steel companies will produce ferromanganese in the near future. The spiegeleisen market is quiet but very strong at $75, furnace, at which level sales have been made for domestic consumption. Ferrosilicon, 50 per cent, is extremely quiet, most producers being sold up to July. For such quantity as is available, the price is more or less nominal at $80 to $90 per ton, delivered.

Finished Iron and Steel.—Attention is focused on expediting shipments to customers. The shipping situation shows little improvement. One western Pennsylvania plant has close to 50,000 tons of steel products in its yards awaiting cars. Where solid trainloads can be moved to one plant, there is a little relief both for the mills and the consumers, but the number of such shipments that can be made is, of course, small. Some steel plants, particularly plate mills, are in the market for spot business because of open space in their rolling schedules due to inability to ship against existing orders. Plates are slightly lower, it now being fairly easy to obtain tank steel or universal plates at 3.50c. to 3.75c., Pittsburgh, even from mills that until recently have been adhering closely to 4c. on all grades. The American Locomotive Co. has been a fairly large buyer of plates in the past week or two, its purchases totaling several thousand tons. Shapes are not in great demand owing to the drop in building work, but prices appear to be fairly firm at about 3.10c. to 3.75c., Pittsburgh. Mills which have been asking 4c. do not find it so easy to get business at that price. There is little new in the steel bar situation, except that one Eastern mill may soon be in position to take on a fairly large tonnage for early delivery, but the larger sizes will be given preference. No new car business has developed within the week, the railroads now waiting, it appears, for action by Congress on an appropriation for 100,000 freight cars. According to the Railway Car Manufacturers Association, the shops in the country building freight cars are now working at only 10 per cent of capacity. In March the output of freight cars by seventeen members of this association was slightly over 3000, while the monthly capacity is from 27,000 to 28,000. The statement is made that it will require fully six months from now to turn out 100,000 cars, even if Congress authorizes the funds within the next 30 days. For this number of cars about 1,000,000 tons or more of steel would be required, and it is questionable whether this can be obtained without some sort of priority arrangement. At a recent meeting the car builders considered asking for priority, but in view of the present railroad crisis the feeling is that the steel companies, as shippers, will be willing to grant preferential treatment to the car companies without resort to any Government aid in getting a priority order. Most of the car builders are covered by contracts with the steel companies, but have specified only a small portion

of the steel they expected to use. New structural lettings include the following:

Borden Condensed Milk Co., Madison Avenue, New York, 2000 tons, to American Bridge Co.
Apartment building, 300 Park Avenue, New York, 3500 tons to American Bridge Co., and 2000 tons to Phoenix Bridge Co.
Building in Virginia for New Jersey Zinc Co., 200 tons, to American Bridge Co.
Foundry for Ingersoll-Rand Co., Painted Post, N. Y., 300 tons, to American Bridge Co.
Apartment building, Broadway and Ninety-seventh Street, New York, 2600 tons, to McClintic-Marshall Co.

The following jobs are up for bids:

Highway bridge, Brattleboro, Vt., 300 tons.
Plant for Vreeland Motor Co., Irvington, N. J., 600 tons.
Office building in Philadelphia for Sun Oil Co., 400 tons.
Reconstruction of plant in Virginia for Virginia-Carolina Chemical Co., 1600 tons.

The Phoenix Bridge Co. was low bidder on 1500 tons for the elevated railroad in Philadelphia.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.52c.; shapes, 2.72c. to 4.27c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the second quarter; bar iron, flats, wider than 6 in., 4.57c.; ⅜ and 7/16 in., round and square, 5.27c.; light rounds, squares and flats, 5.77c., and other sizes, 4.27c.

High Speed Steel.—Standard high speed steel containing 18 per cent tungsten is quoted at $1.25 to $1.30 per lb., New York. Special grades containing uranium and high vanadium contents are selling at about $1.50 per lb., New York.

Warehouse Business.—Few cars are being received by warehouses in New York and shipments are made with great difficulty. Inquiries for wire have been heavy, but warehouses are unable to place orders with mills as a rule for earlier than fourth quarter delivery. The strike in the brass and copper mills is not settled and prices are nominal. We quote prices on page 1496.

Cast Iron Pipe.—That manufacturer considers himself wise who has been taking orders that are scattered relative to geographical position. Those who have been concentrating on getting orders from a closely embargoed section like New England are now having extreme difficulties in making shipments. Those with the scattered orders are shipping to the district which for the time at least is available. An instance, typical of conditions, is that of a contractor laying a pipe line at Coney Island, against whom was a penalty for delay in completion, who was forced to send trucks 70 miles to get pipe he had bought, this pipe costing him $100 a ton, delivered. Manufacturers are more pessimistic than ever over transportation conditions. We quote 6-in. and heavier at $76.30, New York; 4-in. $79.30, with $2 additional for Class A and gas pipe.

Old Material.—Dealers secured on an average about two cars last week for making shipments. Therefore the tone of the market seems a trifle better though prices remain about the same. We have marked up a trifle car wheels and the best grades of cast. One New York broker has marked downward buying prices on a dozen grades and marked them up on about four grades.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$19.50 to $20.00
Rerolling rails	30.00 to 31.00
Relaying rails, nominal	52.00 to 54.00
Steel car axles	39.00 to 40.00
Iron car axles	43.50 to 44.00
No. 1 railroad wrought	31.50 to 32.50
Wrought iron track	22.00 to 22.50
Forge fire	15.50 to 16.00
No. 1 yard wrought, long	24.50 to 25.00
Light iron	9.00 to 10.00
Cast borings (clean)	16.50 to 17.00
Machine-shop turnings	15.00 to 15.50
Mixed borings and turnings	15.00 to 15.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	20.50 to 21.00
Stove plate	28.00 to 28.50
Locomotive grate bars	28.00 to 28.50
Malleable cast (railroad)	29.00 to 30.00
Old car wheels	37.00 to 38.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$40.00 to $41.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	39.00 to 40.00
No. 1 heavy cast, not cupola size	32.00 to 33.00
No. 2 cast (radiators, cast boilers, etc.)	31.00 to 32.00

Boston

BOSTON, May 18.

Pig Iron.—Total sales during the past week were about 7000 tons, including 400 tons northern, silicon 2.75 to 3.25, last half, at $48 furnace or $45 base; 400 tons eastern Pennsylvania, silicon 2.25 to 2.75, last half, at $49.25 or $47 furnace base; approximately 1000 tons western and central Pennsylvania, silicon 2.25 to 2.75, last half, at $46.25 furnace, or $45 base; about an equal amount of Virginia, low silicon, last half, at $43.25 furnace; about 500 tons Alabama, silicon 1.75 to 2.25, nearby shipment, at $42 furnace, and more than 1000 tons Alabama, No. 2X, nearby delivery, at $43.70 furnace; 100 tons malleable, resale, at $46 furnace; and 900 tons northern charcoal, last half, and one car resale iron, spot shipment, at $55 furnace. Almost all of the Alabama iron sold was taken by melters located at New Haven Railroad points, as was the case in other grades for future delivery. The bulk of the little iron available has been Alabama, which has been trucked across Boston to the New Haven, Boston & Maine or Boston & Albany railroads. Embargoes have kept out other kinds of iron, but this situation has been relieved somewhat during the past few days, so that many small foundries, hard pressed for pig, may get fresh supplies. With one or two exceptions the foundries have managed to keep going by borrowing or buying a car of spot iron. Delivered prices follow:

East. Penn., sil. 2.25 to 2.75	$49.15 to $51.15
East. Penn., sil. 1.75 to 2.25	47.90 to 49.90
Cent. & West. Penn., sil. 2.25 to 2.75	49.95 to 50.95
Cent. & West. Penn., sil. 1.75 to 2.25	48.70 to 49.70
Buffalo, sil. 2.25 to 2.75	49.15 to 50.15
Buffalo, sil. 1.75 to 2.25	47.90 to 48.90
Virginia, sil. 2.25 to 2.75	49.20 to 50.95
Virginia, sil. 1.75 to 2.25	47.95 to 49.70
*Alabama, sil. 2.25 to 2.75	49.45
*Alabama, sil. 1.75 to 2.25	47.75

*Alongside Boston prices.

Warehouse Business.—Mill shipments of iron and steel have been received by warehouse jobbers since last reports, those of the former outnumbering the latter about three to one. Although local stocks are not normal, this market appears better supplied than some others elsewhere, orders being received here from consumers as far away as the Hawaiian Islands. It is commonly predicted that iron and steel will go to 6c. per lb., f.o.b. warehouse, before June 1. Jobbers have marked up machine bolts, with and without C. T. & D. nuts, and semi-finished and finished case hardened nuts 10 per cent. C. P. C. & T. cold nuts 1c. to 4c. per lb., bolt ends 5 per cent and coach screws 5 per cent, the last now being 20 per cent discount.

Jobbers quote: Soft steel bars, $5.50 base per 100 lb.; flats, $6 to $6.35; concrete bars, $5.50 to $6; tire steel, $6.50 to $7; spring steel, open hearth, $10; crucible, $15; steel bands, $7.25; steel hoops, $8.25; toe calk steel, $7.25; cold rolled steel, $8 to $8.50; structural, $5.50; plates, $6; No. 10 blue annealed sheets, $8; No. 28 black sheets, $9.50; No. 28 galvanized, $10.50; refined iron, $5.50 base; best refined, $7; Wayne, $8; band iron, $7.25; hoop iron, $8.25; Norway iron, $20.

Tool Steel.—Although there is no noticeable increase in the demand for tool steel, prices as quoted from warehouses are firmer because of the rapidly dwindling stocks.

Jobbers quote: Ordinary tool steel, 18c. per lb. base; extra, 20c. base; double special, 66c. base; non-changeable, 36c. base; high speed steel, $1.25 to $1.40 base. Mill shipments are quoted at 1c. per lb. less.

Finished Iron and Steel.—New England has been practically shut off from mill shipments since last reports, and mill representatives have been instructed to accept no new business. The corporation is accepting business, but with no guarantee of delivery. The Republic Iron & Steel Co. has been trying to arrange for a solid train for New England, and the Lackawanna Steel Co. for shipments via canal to Troy, N. Y., where connection can be had with the Boston & Albany Railroad. Sheets of all kinds are scarce. A Gloucester, Mass., consumer will close down this week, and other consumers are at the danger point. The Bath Iron Works, Ltd., Bath, Me., has placed approximately 50 tons of plates with the Lukens Steel Co. for marine boilers, making 12 such boilers under contract. The

top price on plates is 4c., f.o.b. Pittsburgh, which is about ¼c. less than it was two months ago. The New Haven Railroad has bought an additional 1000 tons of 80-lb. rails from the Lackawanna Steel Co. A little fabricating material comes forward slowly, building projects are held up as a result and new business is at a minimum. The Bethlehem Steel Co. has a large amount piled, owing to the transportation situation, and may have to suspend operations unless conditions improve.

Old Material.—Lifting of embargoes during the latter part of last week put more life into the old material market, but business continues far from active. New England melters continue to buy No. 1 cast, usually at around $39, yard, which would indicate a slightly easier market; notwithstanding, some dealers still quote $40. No No. 2 cast is moving. Some stove plate is being purchased, but at not more than a $28 yard basis, or about $1 less than last week's top price. The call for street car axles has dropped to small proportions, and dealers report practically nothing doing in yard wrought. One consistent heavy melting steel buyer has dropped his price from $20.40 to $19.50, but some yards continue to hold for $20 or better. Pipe is being taken moderately at $1 less than a week ago, namely $20.50 for eastern Pennsylvania mills. Light purchases of turnings and borings serve to hold prices steady. The market for railroad malleable and rerolling rails is flat. Local yard prices follow:

No. 1 heavy melting steel	$18.00 to $19.50
No. 1 railroad wrought	27.00 to 28.00
No. 1 yard wrought	24.00 to 25.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	20.00 to 20.50
Machine-shop turnings	14.00 to 15.00
Cast iron borings	15.50 to 16.50
Heavy axle turnings	16.00 to 17.00
Blast furnace borings and turnings	14.00 to 15.00
Forged scrap	14.50 to 15.50
Bundled skeleton	14.50 to 15.50
Street car axles	31.00 to 33.00
Car wheels	37.00 to 38.00
Machinery cast	38.00 to 40.00
No. 2 cast	35.00 to 36.00
Stove plate	27.00 to 29.00
Railroad malleable	26.50 to 27.50
Rerolling rails	27.50 to 28.50

Cleveland

CLEVELAND, May 18.

The strike situation in the Cleveland territory shows practically no change as compared with a week ago. All local steel plants are running, but generally are not shipping more than half of their product. Very little pig iron is being shipped from this city, but the McKinney Steel Co. has been able to ship most of its semi-finished steel by moving it in trainloads. Embargoes are enforced against Cleveland from most points, but two trainloads of steel have reached this city from Johnstown, Pa., and a few single-car shipments are coming from Pittsburgh. Cleveland mills are making shipments to Detroit by boat, and some steel is coming to this city by water from a Chicago warehouse. Most manufacturers are operating their plants at a greatly reduced capacity because of a lack of steel and inability to ship their product. Thousands of men have been laid off at the Akron rubber plants. The outstanding feature this week as the result of the strike is the easing up of the labor situation. Common labor has become so plentiful that employers are able to cull out inefficient workmen.

Iron Ore.—Only about half as much ore is being shipped from the upper Lakes as would be moving were it not for the switchmen's strike and the consequent railroad congestion, and outlook continues bad. It is estimated that fully a month has been lost already both in the movement of ore down the Lakes and in the movement of coal up the Lakes. The only improvement reported is a little better movement of ore from the Pennsylvania docks in Cleveland and from Ashtabula and Erie. Twenty trainloads of ore were shipped from the latter port over the Pennsylvania Railroad Sunday. The Bessemer & Lake Erie Railroad is still completely tied up, so that no ore is being unloaded at Conneaut. Nearly all the ore that is being shipped is being delivered to Lake front docks. About 1000 carloads are tied up on Cleveland tracks awaiting shipment. A large part of the fleet of the Pittsburgh Steamship Co. is out of commission. Independent shippers are operating nearly all their boats, but these are often held up for several days waiting for cars to take their cargoes. Many have been held up for several days for bunker coal. Very little coal is being received for shipment to the Northwest and a serious shortage of fuel is threatened in that section during the coming winter. Operations at a number of open pit mines have been suspended and steam shovel crews have been laid off because of the transportation situation and in order to conserve fuel at the mines. It is expected that operations will have to be suspended in some underground mines because of the lack of fuel. An advance of 10c. per ton in ore carrying charges was made during the week in two contracts placed by local shippers for vessel capacity to move about 1,500,000 tons of ore, these contracts being taken on the basis of $1.10 free from ports at the head of Lake Superior. Previously contracts were made at a $1 per ton rate, but a number of vessel men refused to take contracts at that rate and only about 400,000 tons of ore was placed at the $1 rate. Some of these contracts contained a clause providing for an advance in the rate, should the rate be changed later, and these contracts will be revised to the $1.10 rate. Some of the vessel men wanted a rate as high as $1.25 per ton, but it is believed that the placing of two large contracts at the $1.10 rate establishes that as the rate for the season. The increased cost in moving ore will be borne by the shippers.

We quote, delivered lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—The market is very quiet, although there is some demand for small lots of Northern foundry iron for prompt shipment. There is practically no inquiry for last half contracts. The railroad situation has improved slightly with local furnaces, so that they are able to ship a little more of their iron than a week ago, but they are still piling most of their product. Some of the other furnaces operated by Cleveland interests are able to ship nearly all of their iron. Current orders for the most part are coming from foundries that did not purchase enough iron to last through the first half. One interest reports sales during the week aggregating 1700 tons, about 1000 tons of which was for early shipment. Only one consumer is reported to have requested that shipments be held up because of conditions growing out of the strike, that request coming from a Michigan automobile firm. Prices are firm at $44 to $45 for No. 2 foundry iron for early shipment and most producers are quoting $44 for contracts. We note the sale of 500 tons of 2.25 to 2.75 per cent silicon foundry iron by a western New York furnace for early shipment to a New England consumer at $48, or at a basis of $46.75. A little Southern iron is reaching this territory, but shipments from Alabama district are slow. The McKinney Steel Co. will blow out one of its large Cleveland furnaces this week for relining.

We quote delivered Cleveland, as follows, based on 40c. switching charge for local iron, a $1.40 freight rate from Valley points, and $5 from Birmingham:

Basic		$43.40
North. No. 2 foundry, sil. 1.75 to 2.25	$44.40 to	45.40
Southern foundry, sil. 2.25 to 2.75		48.70
Gray forge		41.40
Ohio silvery, sil. 8 per cent		61.40
Standard low phos., Valley furnace	48.00 to	50.00

Coke.—The coke situation is still very serious. Several trainloads of foundry coke have reached Cleveland since the strike, but much of this went to large consumers to fill spot shipment orders. One producer is now shipping a trainload to take care of contracts.

Bolts and Nuts.—Bolt and nut makers are trying to avoid the taking of orders until operating conditions improve. Some are operating their plants only four days a week and are able to ship only 60 per cent of their product. Cars are not available and many shipments are being made by boat and truck.

Finished Iron and Steel.—Demand for finished steel is not active, and some of the mills are getting in better shape on deliveries. This is particularly noticeable in plates, on which some of the mills are now promising deliveries in 30 days. Plate prices are easier. While the 4c. price has not disappeared, 3.50c. to 3.75c.

prices are now more common for tank plates. There is a fair demand for small lots of steel bars, and one consumer in the implement field is offering 3.50c. as a contract price. No new work is coming out in the building field, and demand for reinforcing bars has fallen off materially. The ruling price of 4c. for hard steel bars has been shaded to 3.75c. A Buffalo mill has taken 200 tons of sheet steel piling for the Cleveland Discount Co. building, and an inquiry is pending for 500 tons for Government work along the Ohio River. Inquiry for semi-finished steel for export continues active. Sheets are still in good demand. We quote black sheets at 7c. to 8c.; blue annealed sheets at 6c. to 6.25c.; galvanized at 7.25c., but some mills are still getting higher prices for early shipment. An offer of 10c. is reported for automobile body sheets, which have recently sold at considerably higher prices. The demand for high-speed steel has eased off considerably.

Cleveland warehouses quote steel bars at 3.27c. to 5c.; plates, 3.57c. to 5c., and structural material, 3.70c. to 5.10c.

Old Material.—The scrap market is almost at a standstill. Dealers are unable to move any material, owing to the congestion. Some scrap has been loaded on cars here for three weeks awaiting shipment to the Pittsburgh district. The market is weak, but there are not enough transactions in most grades to form a price basis. A Cleveland mill has been offered a round tonnage of heavy melting steel scrap by an outside dealer at $24.50 delivered. A little trading is reported between dealers on borings and blast furnace turnings at $16.50 to $16.75, or about 50c. lower than recent prices.

Dealers quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$23.50 to $24.00
Steel rails under 3 ft.	25.00 to 27.75
Steel rails, rerolling	31.00 to 32.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	26.25 to 26.50
Cast borings	16.50 to 16.75
Iron and steel turnings and drillings	13.50 to 14.00
Short turnings for blast furnaces	16.50 to 16.75
Compressed steel	18.50 to 19.00
Railroad wrought	28.00 to 29.00
Railroad malleable	31.00 to 32.00
Steel axle turnings	19.50 to 20.00
Light bundle sheet scrap	15.00 to 15.50
Drop forge flashings over 10 in.	17.00 to 17.50
No. 1 cast	41.00 to 42.00
No. 1 busheling	18.50 to 18.75
Railroad grate bars	29.00 to 30.00
Stove plate	29.00 to 30.00

St. Louis

ST. LOUIS, May 17.

Pig Iron.—While melters are continuing to buy pig iron in small lots, the transportation situation continues to affect business and on prompt shipment orders, trucking from distant tracks is still the order of the day. On deferred shipment transactions, no very large business is being done, the disposition of foundrymen and others being to proceed cautiously, while furnaces are disinclined to take any large amount of business under present conditions. Prices asked in this market have shown no change, but are stiffly held at $42 to $44 Birmingham basis for No. 2 Southern. Lack of fuel is also causing some trouble and production is limited materially in most of the plants still in operation.

Coke.—No business is being done in coke and receipts under old contracts are not up to needs, with the result that operations of melters and others are being interfered with. Practically all the ovens represented in this market are reported as withdrawn for one cause or another, chiefly due to the transportation situation.

Finished Material.—In finished products the lack of incoming material is interfering with building and other operations, and fabricators generally are having trouble in taking care even of their most urgent business. Mill representatives are steering away from all classes of orders, deliveries being in such state that they cannot safely enter into definite agreements. Movement out of warehouses continues limited only by ability to provide material, many classes and sizes of which are completely out and others nearly so.

For stock out of warehouse we quote as follows: Soft steel bars, 3.94c.; iron bars, 4.50c.; structural material, 4.04c.; tank plates, 4.24c.; No. 10 blue annealed sheets, 7.09c.; No. 28 black sheets, cold rolled, one pass, 8.10c.; No. 28 galvanized sheets, black sheet gage, 9.60c.

Old Material.—In the scrap market there has been practically no change from the last reports. No material can be moved, or at least very little, with the result that no transactions are taking place. Dealers can only play a waiting game, and while the natural tendency of a stagnated market is to soften, there is no disposition on the part of scrap dealers to change their quotations even though they are not doing any business. In fact, the lack of business at present renders the quotations purely matters of estimated value.

We quote dealers' prices f.o.b. customer's works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$32.50 to $33.00
Old steel rails, rerolling	31.50 to 32.00
Old steel rails, less than 3 ft.	26.00 to 26.50
Relaying rails, standard sections, subject to inspection	50.00 to 55.00
Old car wheels	34.50 to 35.00
No. 1 railroad heavy melting steel	22.50 to 23.00
Heavy shoveling steel	21.50 to 22.00
Ordinary shoveling steel	21.00 to 21.50
Frogs, switches and guards, cut apart	24.00 to 24.50
Ordinary bundled sheets	14.50 to 15.00

Per Net Ton

Heavy axle and tire turnings	16.00 to 16.50
Iron angle bars	29.50 to 30.00
Steel angle bars	22.00 to 22.50
Iron car axles	39.50 to 40.00
Steel car axles	33.50 to 34.00
Wrought arch bars and transoms	31.00 to 31.50
No. 1 railroad wrought	25.50 to 26.00
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	22.50 to 23.00
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	22.50 to 23.00
No. 1 dealers' forge	22.00 to 22.50
Cast iron borings	14.00 to 14.50
No. 1 busheling	21.50 to 22.00
No. 1 boiler, cut to sheets and rings	17.00 to 17.50
No. 1 railroad cast	35.00 to 35.50
Stove plate and light cast	30.50 to 31.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	25.50 to 26.00
Pipes and flues	17.00 to 17.50
Heavy railroad sheet and tank	16.50 to 17.00
Railroad grate bars	27.50 to 28.00
Machine-shop turnings	13.50 to 14.00
Country mixed	19.00 to 19.50
Uncut railroad mixed	19.50 to 20.00
Horseshoes	24.50 to 25.00

San Francisco

SAN FRANCISCO, May 11.

In some respects the railroad strike is causing real hardship, both on account of the local difficulty in having cars switched and also on the continued delay of overdue freight. This latter is said to be causing a serious condition, and some of the foundries are reported on the point of closing down because of the non-arrival of long overdue consignments. Some of the foundries are also conserving their supply of coke and refusing new business in the effort to take care of their regular customers during the shortage. It is said there is not a ton of coke held locally which is for sale.

Bars.—Bars are somewhat easier. According to the Pacific Coast Steel Co., bars are priced at 4.25c. for local consumption. A somewhat higher price is asked for export, but at present none are being exported. There have been cancellations of orders from Japan, but none of the bars contracted for on Japanese account has been thrown on the market. Some dealers say that they are unable to get bars for immediate delivery at less than from $4.50 to $4.75, notwithstanding the easier condition of the market.

Structural Steel.—A contract for approximately $200,000 for structural steel to be used in the erection of the Federal Reserve bank building in this city has been awarded to the American Bridge Co.

Cast Iron Pipe.—The local bond market for municipal bonds is very quiet, and the bonds are moving out very slowly. This has had the effect of holding up a considerable municipal demand for cast iron pipe. There appears to be a great deal of interest and in-

quiry, but the expected amount of business from the known needs is not materializing as rapidly as expected. The city of San Bruno is calling for new bids for about 6 miles of 4, 6, 8 and 10-in. cast iron pipe, and Prescott, Ariz., is calling for bids on about half as much of the same descriptions.

Pig Iron.—Practically no pig is coming into this market at present, although some shipments by water are reported on the way.

Old Material.—The scrap situation is described by the Pacific Coast Steel Co. as somewhat easier, and the company is now paying $27 per ton. In other places as high as $30 a ton is being paid, and in the case of about 6000 tons recently sold by the Mare Island Navy Yard $35.86 was bid. This scrap is described as miscellaneous steel scrap and is made up of wrought, galvanized, tubes, etc., but the assertion is made there is no brass, copper or material other than steel in it. While it is a considerable amount it can hardly be considered a market price, as none of the mills will pay that price on the present market. The opinion is expressed that the buyer bought for export, which in the present condition of the Oriental market is regarded as a hazardous proceeding.

Philadelphia

PHILADELPHIA, May 18.

The apathy of buyers becomes more marked. With the exception of steel bars, there is no buying worthy of note. The steel, pig iron and scrap markets have gone through another exceedingly quiet week. The railroad situation shows little, if any, improvement. Troubles are overcome in one direction only to be faced in another. Producers and consumers alike are having great difficulty in operating and shipping and a portion of the trade believes that transportation is more muddled than ever. Efforts of the Interstate Commerce Commission to establish a more orderly condition are being watched with interest, but there is opposition to any form of priority, the belief being that if a sufficient supply of labor is obtained by the railroads, the present troubles will be gradually ironed out.

There is naturally speculation as to the ultimate effects of the railroad tie-up on future steel and pig iron business and prices. A view taken in some quarters is that present conditions will result in a greater shortage in pig iron and steel, with higher prices as a natural result, but the possibility of a greatly curtailed consumption of these products is also pointed out. Aside from plates, which show some weakness, the steel market is strong, with the price tendency upward. The same is true of pig iron, but scrap is weak and prices are lower. Tank plates and universal plates are obtainable from some mills at 3.50c. and in one or two instances ship plates have been sold at this price. On the other hand, we note a sale of several thousand tons of skelp rolled on a universal mill at 4c., but in this case prompt delivery is to be given. Steel bars have sold at from 4c. to 4½c. and band steel at 6c., Pittsburgh.

Pig Iron.—The market is firm, though there is very little demand from consumers. Most of the selling is for prompt shipment and such business is largely in carload lots. The minimum for eastern Pennsylvania foundry iron is $45, furnace, this applying to the grade analyzing 1.75 to 2.25 per cent silicon, while some furnaces are getting $47, furnace, for the same grade. Virginia furnaces are making sales on the basis of $45, furnace, the delivered price Philadelphia No. 2 plain iron being $49.10. With spot furnace coke selling at from $14 to $16, Connellsville, some furnace operators predict that foundry iron will soon go to $50 base, furnace. Through an error in transmission, the statement appeared in this report last week that operators of furnaces do not look for further price advance. Quite the contrary is true and not even the demoralized industrial situation seems to affect this view-point. Upwards of 1000 tons of standard low phosphorus iron has been sold at $52, furnace, an advance of $2 per ton.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa., No. 2 X, 2.25 to 2.75 sil.	$47.15 to $49.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	45.90 to 48.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	49.10
Virginia No. 2 X, 2.25 to 2.75 sil.	50.35
Basic deliv. eastern Pa.	44.80
Gray forge	43.00 to 44.00
Standard low phos. (f.o.b. furnace)	52.00
Malleable	46.75
Copper bearing low phos. (f.o.b. furnace)	47.00

Ferroalloys.—Sales of ferromanganese are principally carload lots, on which prices range from $230 to $250 delivered. The price for second half continues at $200. Sales of carloads of spiegeleisen have been made at $70, furnace, though two leading producers continue to quote $75.

Coke.—The coke situation is the cause of considerable worry, several furnaces having been obliged to bank or cut down their blast within the past week. Furnace coke has sold at from $14 to $16, Connellsville, for prompt delivery, but on month to month buying the price averages about $10. Foundry coke is exceedingly difficult to get owing to the railroad situation.

Semi-Finished Steel.—Open-hearth re-rolling billets are still quoted by one eastern producer at $60 to $65, Pittsburgh, but others quote a higher price. Forging billets are quoted at from $75 to $85, Pittsburgh.

Plates.—Operations at plate mills are still hampered to some extent by the shortage of fuel. The fact that there are so few points to which the mills can make shipments also results in difficulty in making up rolling schedules. Some mills are trying to get new business at points to which shipments can be made, and in several instances at the sacrifice of prices. Tank and universal plates are now available at 3.50c., but an eastern mill has gotten 4c. on a few thousand tons of skelp, rolled on a universal mill. Specification plates are not so easily obtained under 4c., but it is reported that some of the shipyards have gotten ship steel at around 3.50c. to 3.75c., Pittsburgh, from mills in the central territory. There are inquiries out for plates for about 200 locomotives, some of which have not been actually placed with the locomotive builders. President Vauclain of the Baldwin Locomotive Works has returned from Europe with a large order for locomotives from the Rumanian Government. The market may be quoted at from 3.50c. to 4c., Pittsburgh, depending on quality and delivery required.

Old Material.—Practically all of the eastern steel companies have ordered suspension of shipments of steel scrap, one company having more than 30,000 tons in its yard. The market is almost stagnant, the only activity being in small lots of foundry scrap. Some prices are lower. We quote for delivery at consuming points in this territory as follows:

No. 1 heavy melting steel	$23.00 to $24.00
Steel rails rerolling	32.00 to 33.00
No. 1 low phos., heavy 0.04 and under	30.00 to 31.00
Car wheels	40.00 to 41.00
No. 1 railroad wrought	33.00 to 34.00
No. 1 yard wrought	27.00 to 28.50
No. 1 forge fire	19.00 to 19.50
Bundled skeleton	19.00 to 19.50
No. 1 busheling	20.00 to 22.00
No. 2 busheling	17.00 to 18.00
Turnings (short shoveling grade for blast furnace use)	18.00 to 19.00
Mixed borings and turnings (for blast furnace use)	17.50 to 18.00
Machine-shop turnings (for rolling mill and steel works use)	18.50 to 19.00
Heavy axle turnings (or equivalent)	20.00 to 21.00
Cast borings (for rolling mills)	20.00 to 21.00
Cast borings (for chemical plants)	22.00 to 23.00
No. 1 cast	38.00 to 39.00
Railroad grate bars	29.00 to 30.00
Stove plate	28.50 to 29.50
Railroad malleable	28.00 to 29.00
Wrought iron and soft steel pipes and tubes (new specifications)	24.00 to 24.50
Iron car axles	45.00 to 46.00
Steel car axles	42.00 to 44.00

Structural Material.—A building for the Bell Telephone Co., requiring 350 tons, has been let to an independent fabricator. The Sun Oil Co. may build an office building requiring about 500 tons. The demand for structural shapes is not active, but sales have been made in the past week at 4c., Pittsburgh. This rep-

resents the top price. In some instances 3.10c. to 3.75c., Pittsburgh, is obtainable on plain material.

Bars.—The most active article in the list of steel products is bars. Sales aggregating several thousand tons have been made by one mill in the past week at 4½c., Pittsburgh. Two thousand tons of deformed reinforcing bars have been sold for early shipment to the South at 4c.; a locomotive builder has taken 1000 tons of soft steel bars at the same price, and a 500-ton lot was sold at 4½c. Five hundred tons of band steel was sold at 6c., Pittsburgh.

RAIL TIE-UP CHECKS EXPORTS

Exporters Use Other Ports Than New York—Japanese Depression Affects All Orient —British Buying

Lack of transportation has superseded high prices, adverse exchange and scarcity of material as an obstacle to export trade. The Japanese are no longer active and the entire Far East has to a great extent withdrawn from the market, with the exception of the Dutch East Indies. European buyers, however, are inquiring and numerous small orders are being received. The financial depression in Japan is affecting the Chinese and other markets, according to advices from the Hong Kong office of a New York firm, the cable adding that the situation in Japan is evidently unimproved. Exporters to Japan are still offering material ordered from the mills for Japanese delivery, one export house having recently sold for export to other markets about 4000 tons of steel bars, at the prevailing price. This same exporter expects to offer an additional 5000 tons of steel bars. One New York exporter has recently resold about 20,000 kegs of wire nails for export, chiefly to the Dutch East Indies, Hong Kong and Manila. The Japanese government continues to buy and an exporter with an inquiry for about 30 miles of light rails from this source has received an order with irrevocable credit.

Pig-iron inquiries from Europe are active and inquiries have been received from England for ship and tank plates. A large independent mill has accepted an order from England for 1000 tons of tank plates at a price better than 3.95c. f.o.b. mill. An eastern mill has booked an order for 4000 tons of 2½-in. and 3-in. open-hearth rerolling billets for June shipment to England, at $75, Pittsburgh. The American branch of a British export firm has purchased about 20,000 kegs of nails within the last fortnight and shipped them to the London office, where they will probably be held for re-export.

A number of inquiries are being received from South American markets for gas and water pipe. An exporter to South America, Cuba and the Philippines reports 3000 tons shipped in April, less than half his March figures.

In an attempt to make deliveries to customers and release some of the thousands of dollars tied up in letters of credit, some exporters are trying to ship through the ports of Philadelphia and Boston, which are less congested than the Port of New York.

Volume of Fabricated Steel Business

The total amount of fabricated steel work contracted for in April appears to be about 122,500 tons against 150,000 tons in March, 171,000 tons in February and 135,000 tons in January. According to the records of the Bridge Builders and Structural Society, collected by George E. Gifford, its secretary, in March, 83½ per cent and in April 68 per cent of the entire capacity of the bridge and structural shops of the country was put under contract. The falling off in business in April is not, however, relatively large, and the total for the four months of the year is greater than that for the same period in any year since 1911, being a little more even than the total of the active structural steel business in 1916. Larger percentage drops in the April volume of business as compared with the March occurred in both 1913 and in 1916.

British Prices Again Advancing

Northeastern Steel Makers Raise Prices—Coke Higher—Japan Reselling Bars

(*By Cable*)

LONDON, ENGLAND, May 18.

Present prices for Cleveland pig iron will apply for this month only because a further revision is expected, makers stating that the recent increase is inadequate. The situation as to hematite iron is still acute, makers cleaning up old contracts before entering new ones.

The foreign iron ore market is quiet, with Rubio ore quoted at 59s., ex-ship Tees.

Coke has been advanced 7s. 3d. to 62s. 9d.

Northeastern steel makers have advanced all their prices 30s. The canal strike in the Midlands is causing a paralysis in that district and works are closing down owing to an exhaustion of supplies of fuel and raw materials.

Japan has resold steel bars in this market at £27. Germany has sold them at £30 f.o.b. and Belgium at £20 19s. f.o.b. Buyers of Lorraine steel contracts have sent representatives to Paris to approach the French authorities.

The tin plate market is firmer because of renewed buying for prompt delivery, quotations being 74s. to 74s. 6d. for prompt delivery, and 71s. to 72s. for August-September delivery. Black sheets 24 g. have sold at £50 f.o.b.

We quote per gross ton, except when otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.82 for £1, as follows:

	£	s.	£	s.	
Ship plates	26	0 to	32	0	$99.32 to $122.24
Boiler plates	28	10 to	35	0	108.87 to 133.70
Tees	26	10 to	33	0	101.23 to 126.06
Channels	25	15 to	33	5	98.37 to 127.02
Beams	25	10 to	32	0	97.41 to 122.24
Round bars, ¾ to 3 in.	28	0 to	33	10	106.96 to 127.97
Rails, 60 lb. and up	23	0 to	25	0	87.86 to 95.50
Billets	25	10 to	26	10	97.41 to 101.23
Sheet and tin plate bars, Welsh	31	0 to	35	0	118.42 to 133.70
Galvanized sheet, 24 g.	56	0 to	60	0	213.92 to 229.20
Black sheet, 24 g to 26 g.	50	0 to	54	0	191.00 to 206.28
Tin plate, base box	3	11 to	3	14	13.56 to 14.13
Steel hoops	34	15 to	35	0	132.75 to 133.70
Cleveland basic iron	11	7½			43.43
West Coast hematite	14	5			54.43
Cleveland No. 3 foundry (export to allies)	10	5			39.15
Ferromanganese	35	0 to	40	0	133.70 to 152.80
Coke	3	2¾			12.00

British Iron and Steel Output in April

LONDON, ENGLAND, May 18 (*By Cable*).

The production of pig iron in Great Britain in April was 671,000 gross tons and that of steel was 794,000 tons, as compared with 699,000 of pig iron and 840,000 of steel in March. The pig iron output in January and February was 665,000 tons and 645,000 respectively, with the monthly average for 1919 at 617,000 tons. The steel output was 754,000 tons in January and 798,000 tons in February, with the 1919 average at 658,000 tons per month.

Three Blast Furnaces Acquired by Bethlehem Steel Co.

The Bethlehem Steel Co. recently acquired the Bird Coleman furnaces and the North Cornwall furnaces, both situated in Cornwall township, about five miles from Lebanon, according to a deed filed with the Lebanon county recorder. A purchase price of $600,000 is set forth in the deed. The stacks were formerly leased by the Lackawanna Iron & Steel Co., a subsidiary of the Bethlehem Steel Co.

The property was sold by the Saucon Land & Improvement Co., which on May 3 bought the property from the Cornwall Iron Co. for the purchase price set forth in the deed, transferring them to the Bethlehem Steel Co. The plants include three blast furnaces and all machinery and equipment in addition to approximately 220 acres of land.

IRON AND INDUSTRIAL STOCKS

Indications Point to a Lifting of Strain in the Credit Situation

Security values during the past week have continued to fluctuate, first on the down-side and then on the up-side, without getting very far in either direction. Sentiment among investors unquestionably has been influenced to a large degree by the railroad transportation situation, enforced curtailment in production because of a lack of raw material, and a general belief that prices for raw material, finished product and eventually labor will tend downward. But the fundamental factor in the investment and business world to-day is credit, just as it has been for months.

Heretofore the general trend of credit has been downward. In other words, people and producers of raw and finished materials have found it increasingly difficult to obtain funds even at high rates of interest to do business. As a result, there has been a lot of liquidation of stocks and bonds by interests to protect their credit positions. Unmistakable signs to-day point to an easing of the credit strain, especially in the West. And indications are this strain will further be relieved. Money probably will not be cheap for some time, but it probably will be freer. The greater supply of available funds will result from lower prices for raw material and finished products.

This transmission of material and product prices, as well as the credit situation, should be slow and thereby not dangerous to fundamental business principles. It will probably not be of long duration, for there remains a tremendous shortage of goods and materials the world over, and until this shortage is relieved there can be no serious break in merchandise and security values.

The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	33 - 35	Lackaw. Steel....	73 - 77¼
Allis-Chalm. pf...	— - 75	Lake Sup. Corp..	15 - 15½
Am. Can com....	39 - 41¼	Midvale Steel.....	42¼ - 43⅝
Am. Can pf.....	89⅛ - 90½	Nat.-Acme	34⅞ - 36
Am. C. & F. com.	129 -132¾	Nat. E. & S. com.	68 - 71½
Am. C. & F. pf...	— -108	N. Y. Air Brake..	98½ -100
Am. Loco. com...	90⅝ - 94	Nova Scotia Steel.	53½ - 58
Am. Loco. pf.....	— -100¼	Press. Steel com..	96½ - 99
Am. Steel F. com.	39 - 42	Press. Steel pf....	— -100
Am. Steel F. pf...	88 - 88½	Ry. Stl. Spg. com.	92 - 98⅜
Bald. Loco. com..	113⅜ -117½	Replogle Steel.....	84 - 89½
Bald. Loco. pf.....	100 -100¼	Republic com.....	91⅛ - 94
Beth. Steel com...	88 - 90	Republic, pf.....	— - 95
Beth. Stl., Cl. B..	89⅞ - 92⅞	Sloss com.....	68¾ - 69
Beth. Stl., 8% pf.	108½ -109	Superior Steel.....	47⅛ - 48⅜
Case, J. I., pf.....	— - 94	Sup. Stl. 1st pf...	99¾ -100
Chic. Pneu. Tool..	87 - 89	Transue-Williams.	52 - 54⅛
Colorado Fuel.....	30 - 34½	Un. Alloy Steel...	41½ - 42¼
Cruc. Steel com..	133½ -141½	U. S. Pipe com....	16½ - 17
Cruc. Steel pf.....	— - 95	U. S. Pipe pf.....	46½ - 46⅝
Gen. Electric.....	139¼ -141¾	U. S. Steel com..	92½ - 94⅞
Gt. No. Ore Cert..	34⅝ - 35⅜	U. S. Steel pf.....	106 -107⅜
Gulf States Steel.	55¾ - 61	Vanadium Steel...	71½ - 76½
Int. Har. com.....	121 -125⅛	Va. I. C. & Coke.	102 -104½
Int. Har. pf.....	106¾ -107½	Westingh. Elec....	46½ - 51⅝

New York and Newark Foundrymen Meet

At a joint meeting of the Newark Foundrymen's Association and the Gray Iron Club of New York, May 12, the possibility of increasing shipments of pig iron from Buffalo furnaces to Newark by water was discussed. Shipments by water have been made in the past, but it is believed that it might be advisable to increase these shipments on account of the expected advance in freight rates by rail. The matter was referred to the executive committee for investigation.

The foundrymen's association re-elected officers for the ensuing year as follows: President, A. E. Barlow, Barlow Foundry, Inc., Newark; vice-president, George Krause, Jersey City; treasurer, John Campbell, Glockhart Foundry Co., Newark; and secretary, P. A. Smith, P. A. Smith Mfg. Co., East Orange. C. O. Klockers, Essex Foundry Co., Newark, was elected to succeed Paul Debevoise on the executive committee.

To double the capacity of its yards and plant, the Carnick Bros. Co., at Youngstown, Ohio, dealers in scrap iron and steel and other metals, has increased its capital stock from $350,000 to $700,000. Extensions will be made during the next three or four months.

SERIOUS SITUATION

Federal Reserve Officials Adopt Resolutions—Coal and Ore Pool Revival Is Proposed

WASHINGTON, May 18.—Resolutions adopted at a conference to-day of the members of the Federal Reserve Board, the Advisory Council of the system and the Class A directors of the Federal Reserve banks declared transportation conditions to be the most serious phase of the present credit situation. The Interstate Commerce Commission and the Shipping Board were urged to do everything possible to relieve the tieup of traffic as a means of expediting the movement of commodities to market, liquidation of loans on which is imperative.

The conference also adopted resolutions approving a statement of the policy of the board made by Governor Harding. In this statement Governor Harding declared it to be necessary that member banks of the system do everything possible to curtail credits for non-essentials. He said that the board would not undertake to define essential and non-essential industries, but that the member banks should use their best judgment in restricting credit without undue hardship upon business and industry.

In line with efforts to relieve the traffic situation, the Interstate Commerce Commission has advised the Ore and Coal Exchange, with headquarters at Cleveland, that there is need for a revival of the coal and ore pool which was in effect in 1918 as a means of moving coal and ore on the Lakes.

Employees of Hydraulic Steel Co. to Buy Stock

The opportunity of employees to buy common stock in the company to the amount of their annual wages has just been announced by the Hydraulic Steel Co., Cleveland. All are eligible purchasers except those employees not American citizens nor taking steps to become such and those who have been with the company for less than three months. The common stock is worth $40 a share. The company reserves the right "to increase the offering of stock to those employees who are faithful in the carrying out of their purchase contracts or who have rendered exceptional service to the company." Offerings will be made to employees before extended to the public. Though at the present time an employee's annual wages is the limit in amount of his stock purchases, it is the intention of the company that eventually every employee will have the opportunity to become the owner of stock equal in amount to four times his highest annual wages.

This first offering totals 75,000 shares; if subscriptions exceed this, the company reserves the right to cut down subscriptions pro rata. Each subscriber must pay to the company from his wages in June, 1920, not less than 12 per cent of his wages for that month and each month thereafter not less than 6 per cent of his monthly wages, and must pay to the company not less than 50 per cent of any profit-sharing distribution.

The announcement is made in the employees' paper, the *Hydraulic Press*, and it is characterized as "the most important announcement the *Hydraulic Press* has ever published." The entire issue is devoted to explaining the plan for stock acquisition.

Declare for Open Shop

In a manifesto issued on May 13, bearing the signatures of 208 employers and business men in Quincy, Ill., the open shop principle was declared for in emphatic terms. Heretofore, the stove foundries in Quincy, which comprise one of its main industries, have been operated as closed shops. In a meeting on May 14 the union labor forces of the city decided to fight the manufacturers on the issue, denouncing the open shop as "un-American and contrary to the spirit of free institutions."

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper New York			Lead		Zinc	
May	Lake	Electrolytic	Tin New York	New York	St. Louis	New York	St. Louis
12	19.00	19.00	56.50	8.50	8.15	8.15	7.80
13	19.00	19.00	56.00	8.50	8.15	8.15	7.80
14	19.00	19.00	56.00	8.50	8.15	8.10	7.75
15	19.00	19.00	....	8.50	8.15	8.05	7.70
17	19.00	19.00	56.00	8.50	8.15	8.05	7.70
18	19.00	19.00	54.75	8.50	8.15	8.05	7.70

NEW YORK, May 18.

The transportation demoralization continues to have a depressing effect on most of the markets. Demand for copper continues light but prices are fairly firm. Buying of tin for future shipment continues heavy and prices are steady. There has been almost no change in the lead situation either as to demand or prices. Buying of zinc continues negligible with prices slightly easier. The antimony market is quiet and a little lower.

New York

Copper.—The feature in this market is the sharp decline in stocks of crude copper at some of the large refineries and unless this situation, which is caused by the general demoralization in traffic, is soon relieved it may be necessary for some refineries to curtail operations decidedly. A large amount of crude copper is held up in transit in various parts of the country and some refineries have been obliged to take drastic measures to secure this material. There is also a consequent retardation in shipments of the finished product and because of this consumers have little incentive to place orders for material which it is difficult to obtain. Domestic buying is confined to moderate quantities here and there, but the demand for export is fairly good. Leading producers maintain their quotations for early delivery at 19c., New York, with 19.25c. asked for third quarter. These figures also apply to Lake copper for which the demand is light. There also exists an outside market, so called, where small amounts of electrolytic for early delivery are obtainable as low as 18.27½c. to 18.50c., New York.

Tin.—A scarcity of spot Straits tin has developed and constitutes the feature of the week's developments. An inquiry from this side placed in the London market for Straits tin for June arrival here brought the response that there was practically no Straits available on that side. This is further evident from the fact that to-day spot Straits is quoted in London at £302 per ton while spot standard tin is only £287, an unusual spread between the two. To-day spot Straits in New York is quoted at 54.75c. It appears as though the price, which has been close to 56c. the past week, may possibly be more or less pegged at that level and held here regardless of developments in the London market. Buying of future shipments on the New York Metal Exchange has continued very active, transactions since last Monday having totaled at least 725 tons, all for shipments at various periods and at prices ranging from 53.87½c. for July-August shipments to 55.25c. for June shipments, with 56.25c. asked for metal at dock. Most of the transactions were between dealers, though some consumers have been involved. Because of the shortage of Straits tin it is probable that there will be a good demand for Banca and other brands. In the former grade a good business has been done for shipment from the East at 2c. to 3c. under prices for Straits tin. Yesterday the market was quiet with only a fair inquiry. Arrivals thus far this month have been 2485 tons with the quantity afloat reported as 4570 tons.

Lead.—The situation in this market is of a mixed character. Buyers do not seem to be especially interested and are inclined to leave the market alone, while some sellers are taking a hopeful view of the future. The price range appears to be wide with some interests predicting a price of 9.25c., New York, for the first half of June, while others have offered the metal in some instances down to 8.50c., New York. A shipment of 1000 tons of Australian lead on the way to England has been diverted to this market, which shows that it is advantageous to sell this lead here and buy it back cheaper in the London market. We quote the outside market at 8.15c., St. Louis, and 8.50c., New York, the price of the leading interest being unchanged at 8.25c., St. Louis, and 8.50c., New York.

Zinc.—Prime Western for delivery this side of July is quoted at 7.70c., St. Louis, or 8.05c., New York, with a premium asked for third quarter. The market continues almost devoid of demand with large producers still uninterested at present levels and consumers apathetic.

Antimony.—The better grades in wholesale lots for early delivery are quoted at 9.75c. to 10c., New York, duty paid, with the lower grades at 9.50c., New York.

Aluminum.—The virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted at 33c., New York, by the leading producer and at 31.50c., New York, by other interests.

Old Metals.—Business is very quiet. The shipping difficulty keeps the market discouraged. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	18.75
Copper, heavy and wire	17.75
Copper, light and bottoms	15.75
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	18.00
No. 1 yellow rod brass turnings	11.00
No. 1 red brass or composition turnings	15.75
Lead, heavy	7.50
Lead, tea	6.00
Zinc	5.75

Chicago

MAY 18.—Although copper is moving more freely, buying is not in volume. In tin the New York market is lower, but in Chicago it has advanced 3c. because the local supply is exhausted and shipments from the East are not getting through. Lead is firm principally because the available local stocks are not in proportion to the demand for immediate material. Spelter is quiet and weaker. Antimony has declined, but is moving rather freely in small lots at the lower level. In the old metals, zinc and some grades of copper and brass have declined. We quote Lake copper 19.50c. for carloads, tin 60c. to 61c., lead 8.62½c., spelter, 7.85c., and antimony 11c. On old metals we quote copper wires, crucible shapes, 15c.; copper clips, 15c.; copper bottoms, 14c.; red brass, 15c.; yellow brass, 11.25c.; lead pipe, 7c.; zinc, 5.50c.; pewter, No. 1, 35c.; tinfoil, 40c., and block tin, 50c., all these being buying prices for less than carload lots.

St. Louis

May 17.—The non-ferrous markets are quiet, with car lot quotations as follows: Lead, 8.50c.; zinc, 7.90c. In less than car lots the quotations are: Lead, 9c.; spelter, 9c.; tin, 63c.; copper, 20c.; antimony, 12c. In the Joplin district the ore market has been quiet with no particular change in prices. Transportation troubles continue to make buyers cautious, with the result that production is being curtailed to some extent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 9c.; heavy yellow brass, 10.50c.; light copper, 13c.; heavy red brass, 15c; heavy copper and copper wire, 16c.; pewter, 35c.; tinfoil, 43c.; zinc, 5c.; lead, 6c.; tea lead, 3c.; aluminum, 24c.

Because steel mill employees in the Youngstown district, temporarily unemployed, were paid in full last month, the April wage distribution of $8,419,919 was the highest this year and compared with a wage disbursement of $6,755,857 in April, 1919. The March, 1920, payroll for Youngstown was $7,951,935. Payment of two weeks' pay in April, usually held back, increased the total. Full effect of reduced operations and unemployment in the Valley will be reflected in the May distribution.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, with revisions effective from Jan. 1, 1920, in carload lots, to points named, per 100 lb., are as follows:

New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23½c.; Indianapolis, 24½c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; all in carloads, minimum 36,000 lb. To Denver the rate is 99c., minimum carload 40,000 lb.; Omaha, 59c., minimum carload 36,000 lb.; New Orleans, 38½c., minimum carload 36,000 lb.; Birmingham, 57½c., minimum carload 36,000 lb. To the Pacific Coast the rate is $1.25 per 100 lb. on articles of iron and steel, minimum carloads 80,000 lb., while the structural steel rate is $1.25, minimum carload 50,000 lb., or $1.315, minimum carload 40,000 lb. The rate on ship plates, Pittsburgh to Pacific Coast, is $1 per 100 lb., minimum carload 80,000 lb. On wrought iron and steel pipe, the rate from Pittsburgh to Kansas City is 56c., to St. Paul, 49½c.; to Denver, 99c.; to Omaha, 56c., all in carload lots, minimum 46,000 lb. To Jacksonville, Fla., all rail carloads, 41½c., minimum 36,000 lb., less than carloads, 59c.; rail and water, carloads 34½c., minimum 36,000 lb.; less than carloads 46½c. On iron and steel items not noted above, the rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 4c.

Wire Products

Wire nails, $3.25 to $4 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2. Bright basic wire, $3 to $3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.50 base
Large boiler rivets.....4.60 base
Small rivets .....50 per cent off list
Small machine bolts, rolled threads,
40, 10 and 5 per cent off list
Same sizes in cut threads.....40 and 5 per cent off list
Longer and larger sizes of machine bolts,
30 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.40 and 5 per cent off list
Cut threads .....30 and 10 per cent off list
Longer and larger sizes.....30 per cent off list
Lag bolts .....50 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....40 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜ in. x 4 in.:
Smaller and shorter.....35 per cent off list
Longer and larger sizes.....25 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts, 2c. off list
Tapped nuts .....$1.75 off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:
⅝-in. and larger.....60 and 5 per cent off list
9/16-in. and smaller.....70 and 5 per cent off list
9/16-in. and smaller, A. L. A. M. or S. A. E.,
70, 10 and 5 per cent off list
Stove bolts in packages.....70 and 10 per cent off list
Stove bolts in bulk.....70, 10 and 2½ per cent off list
Tire bolts .....55 and 10 per cent off list
Track bolts .....6c. base

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $70; chain rods, $75 to $80; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ to 9/16 in. and larger, $4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅜-in. and 7/16-in., $4.25; 5/16-in., $5; track bolts, $4.90 to $5. Boat and barge spikes, $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 4c. from mill. Common bar iron, 4.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe applying as from Jan. 14, 1920, and on iron pipe from Jan. 7, 1920:

Butt Weld

Steel			Iron		
Inches.	Black	Galv.	Inches.	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	1	+25
½	51	36½	⅜	25½	+ 1½
¾ to 3	54	41½	½	29½	11½
			¾ to 1½	34½	18½
			2 and 2½	33½	17½

Lap Weld

2	47	34½	1¼	24½	9½
2½ to 6	50	37½	1½	31½	17½
7 to 12	47	33½	2	28½	14½
13 and 14	37½		2½ to 6	30½	17½
15	35		7 to 12	27½	14½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	¼	+7	+40
½	48	35½	⅜	23½	6½
¾ to 1½	52	39½	½	28½	15½
2 to 3	53	40½	¾ to 1½	34½	19½
			2 and 2½	34½	19½

Lap Weld, extra strong, plain ends

2	45	33½	1½	27½	13½
2½ to 4	48	36½	2	29½	16½
4½ to 6	47	35½	2½ to 4	31½	19½
7 to 8	43	29½	4½ to 6	30½	18½
9 to 12	38	24½	7 to 8	22½	10½
13	21½	6½	9 to 12	17½	5½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	1⅝ and 1⅞ in.	+20
2½ to 3¼ in.	30½	2 and 2¼ in.	+10
2¼ in.	24	2½ and 2¾ in.	+1
1¾ to 2 in.	19½	3 and 3¼ in.	— 1½
		3½, 4 and 4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

Blue Annealed—Bessemer

	Cents per lb.
No. 8 and heavier	3.50 to 5.95
Nos. 9 and 10 (base)	3.55 to 6.00
Nos. 11 and 12	3.60 to 6.05
Nos. 13 and 14	3.65 to 6.10
Nos. 15 and 16	3.75 to 6.20

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	4.15 to 6.30
Nos. 22 to 24	4.20 to 6.35
Nos. 25 and 26	4.25 to 6.40
No. 27	4.30 to 6.45
No. 28 (base)	4.35 to 6.50
No. 29	4.45 to 6.60
No. 30	4.55 to 6.70

Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70 to 7.50
Nos. 12 to 14	4.80 to 7.60
Nos. 15 and 16	4.95 to 7.75
Nos. 17 to 21	5.10 to 7.90
Nos. 22 to 24	5.25 to 8.05
Nos. 25 and 26	5.40 to 8.20
No. 27	5.55 to 8.35
No. 28 (base)	5.70 to 8.50
No. 29	5.95 to 8.75
No. 30	6.20 to 9.00

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15 to 6.15
Nos. 17 to 21	4.20 to 6.20
Nos. 22 to 24	4.25 to 6.25
Nos. 25 to 27	4.30 to 6.30
No. 28 (base)	4.35 to 6.35
No. 29	4.40 to 6.40
No. 30	4.40 to 6.40
Nos. 30½ and 31	4.45 to 6.45

PERSONAL

Gen. Horace Leander Haldeman, whose sale of his interest in the Pulaski Iron Co., Pulaski, Va., to the Pocahontas Fuel Co., New York, was announced last week, has long been identified with the iron business. He was born in Locust Grove, Lancaster County, Pa., Sept. 16, 1847, was educated in private and public schools of Philadelphia and then enlisted in the Civil War, serving as first lieutenant and captain, 20th Regiment, Pennsylvania Cavalry. He later served on the staffs of a number of governors of Pennsylvania and as a member of the State Senate. After being engaged in the insurance business for two years after the close of the Civil War, and also being employed in the passenger department of the Pennsylvania Railroad for several years, he became a member of the firm of E. Haldeman & Co. in 1872, at Chickies, Lancaster County, Pa. The firm was succeeded by the Chickies Iron Co., and later Haldeman, Grubb & Co., of which he became managing partner. In October, 1898, he sold his holdings and became vice-president of the Pulaski Iron Co., of which he was later made president. General Haldeman is a member of the American Institute of Mining Engineers, Franklin Institute of Philadelphia, American Foundrymen's Association, Philadelphia Foundrymen's Association, and American Society for Testing Materials. His home address is Marietta, Lancaster County, Pa.

H. L. HALDEMAN

The National Engineering Co., Chicago, manufacturer of foundry equipment, and particularly of the Simpson sand mixer, announces the appointment of S. H. Cleland as its eastern sales manager, with temporary offices at 15 East Fortieth Street, New York. Mr. Cleland has had considerable experience with molding sand, core binders and foundry sand mixing equipment. Branch offices operating under his supervision are located at Erie, Pa., Harrisburg, Pa., and Boston.

John Sargent, president Domhoff & Joyce Co., Cincinnati accompanied by his wife, son and daughter, sailed on Saturday, May 15, for a three months' trip to Europe. Mr. Sargent will visit England, France, Belgium, Italy and Spain.

Barton R. Shover, consulting electrical and steam engineer, Oliver Building, Pittsburgh, has added to his organization W. C. Rott, formerly with several large steel plants and prominent designing and constructing engineers as chief engineer and in other capacities.

G. G. Griest, Niles Tool Works, was elected president of the Hamilton Manufacturers' Association, Hamilton, Ohio, at its annual meeting held recently. Other officers elected are: Vice-president, Pierce Long; secretary, H. L. Kutter, and treasurer H. A. Rentschler.

Halford L. Mode, formerly New York district representative Chesapeake Iron Works, Baltimore, manufacturer of Chesapeake cranes, will be with the Champion Engineering Co., Kenton, Ohio, after June 1. He will be associated with W. C. Lloyd & Co., Second National Bank Building, Toledo, Ohio, agents for the Champion crane in the middle western territory, including Michigan, Indiana, Illinois, Ohio, Missouri, Minnesota, Wisconsin and Iowa. He was for seven years with the General Electric Co., about three years with the Shaw Electric Crane Co. Muskegon, Mich., and about two years with the Chesapeake Iron Works.

William McCarthy, who has been in charge of the railroad service department, has been appointed western sales manager of the K-G Welding & Cutting Co., New York. The company recently opened a Chicago office at 12 Harrison Street.

Carl Aichberger, secretary and sales manager Sandusky Foundry & Machine Co., Sandusky, Ohio, has resigned and is now with the Fitzpatrick Products Corporation, 99 John Street, New York, in an executive capacity.

H. W. Evens, Buffalo, N. Y., has become associated with the Frost Mfg. Co., Kenosha, Wis., as general superintendent of brass foundries. He formerly was with the Waterbury works, American Brass Co. and the Medina Stamping & Machine Co. Medina, N. Y.

The Booth Electric Furnace Co., Chicago, has made additions to its sales and engineering staff. B. G. Tarkington, formerly industrial heating engineer with Hodenpyl-Hardy Co., Jackson, Mich. is at the Chicago office in charge of district sales. The Buckeye Products Co., 919 West Fifth Street, Cincinnati, which has charge of sales in the Cincinnati territory, has placed D. E. Carpenter, formerly of the Detroit office of the Westinghouse Electric & Mfg. Co., in charge of sales of Booth furnaces in that district.

J. Edward Goss, supervisor of apprentice instruction Brown & Sharpe Mfg. Co., Providence, R. I., addressed the designing and drafting division, Providence Engineering Society, May 14, on the apprentice system employed at the Brown & Sharpe plant.

George R. Brandon, formerly engaged in engineering and sales of foundry equipment and cranes, has recently been appointed district representative and sales engineer by the General Combustion Co., Chicago, manufacturers of "Oilgas" furnaces for all industrial purposes. His headquarters will be 342 Monadnock Building, Chicago.

James A. Hall has been elected chairman, Providence, R. I., section, American Society of Mechanical Engineers; F. C. Freeman, vice-chairman, and J. D. Guilmette, secretary-treasurer.

Clyde A. Phillips, until recently with the machinery department of the W. M. Pattison Supply Co., Cleveland, is now on the sales force of Cyril J. Bath & Co., machinery merchants, Cleveland.

The New Departure Mfg. Co., Bristol, Conn., has appointed Clarence B. Atkins superintendent of the forge and machine shop. Edward Granger is assistant to Mr. Atkins.

L. H. Keim has been appointed general sales manager of the R. D. Nuttall Co., gear manufacturer-Pittsburgh. Mr. Keim went with the company in 1911 as engineer in charge of erection work and the installation of equipment. One year later, he was promoted to the position of assistant chief engineer, designing and developing heavy duty railway and steel mill gearing. In 1916, he developed a standard tractor transmission unit, and was placed in complete charge of this new field, with headquarters in Chicago, from where he extended service to gear users of every class. From this work Mr. Keim has been brought back to the main offices in Pittsburgh, to become general sales manager.

John F. Tinsley, vice-president and general manager Crompton & Knowles Loom Works, Worcester, Mass., is a representative of employers on the committee named by the Massachusetts Department of Labor and Industries to frame a safety code for workers in the woodworking machinery industry.

E. B. Horne, manager of the forge and foundry divisions of the Packard Motor Car Co., has resigned after 12 years' connection with the company. He will devote his time to the Rochester Foundry & Machine Co., Rochester, Mich.

W. H. Masten has been appointed assistant general manager of the Oakland Motor Car Co., Pontiac, Mich.

E. H. Bauer, engineer of manufacture, Providence Gas Co., Providence, R. I., gave an illustrated address on the manufacture of coke before the New England Foundrymen's Association May 12, at the Exchange Club, Boston. Mr. Bauer has had considerable experience in the manufacture of metallurgical coke, and dwelt at some length on the kinds of coal employed,

the method of their mixing, proper heat treating and incorrect results.

Elmer T. Wible, formerly with the Pittsburgh office of Albert P. Hill Co., advertising agent, has assumed his duties as advertising manager of the Pittsburgh Steel Co., with offices in the Frick Annex, to succeed J. W. Hewitt, who resigned Jan. 1.

N. T. Jones has resigned as director, secretary and sales manager of the Foster Bolt & Nut Mfg. Co., Cleveland. M. J. Riley has resigned as director and superintendent.

Harry D. Carson, who has been connected with the Rogers-Brown Iron Co., Buffalo, and Rogers, Brown & Co., Philadelphia, for the past 20 years, the greater part of this time with the former company, has opened an office at 1401 Pennsylvania Building, Philadelphia, under the firm name of Carson & Co., and will engage in the sale of pig iron, coke, alloys and a general line of steel plant and foundry supplies.

Robert Field has resigned his position with Fairbank & Co., dealers in iron ore, pig iron, steel and coke, Cleveland.

Col. E. E. Arison, L. Reeves Goodwin and L. G. Knapp have organized the industrial engineering firm of Arison, Goodwin & Knapp, with offices in the Webster Building, 327 South La Salle Street, Chicago. Colonel Arison was production manager, Chicago district, ordnance department. He was honorably discharged from Army service in November, 1919. Mr. Goodwin was production engineer in Army ordnance. Mr. Knapp has been an efficiency engineer and works manager.

The Wilson-Maeulen Co., pyrometers, New York, has appointed Harry Goldsen its new representative in the Pittsburgh district. He will have charge of both sales and service in that territory.

Henry Schoch, sales engineer General Briquetting Co., New York, has been elected vice-president of the Nukol Fuel Co., Ontario, Can., with headquarters in Toronto, effective May 17. The Nukol Fuel Co. is manufacturing an anthracite briquette for the Ontario market.

F. William Richards has resigned as works manager and assistant treasurer of the Columbia Malleable Castings Co., Columbia, Pa.

E. W. McCullough, for nine years executive secretary of the National Implement and Vehicle Association, with headquarters at Chicago, has been named manager of the new Industrial Production Department of the United States Chamber of Commerce, Washington.

Thomas Towne, first vice-president and general manager Federal Tool & Alloy Steel Corporation, New York, Brooklyn, Cleveland, Chicago and New Orleans, whose illness since the first of the year finally terminated in a serious operation, has left the hospital, and is making substantial progress toward recovery.

OBITUARY

WILLIAM T. HILDRUP, JR., until recently general manager and a director of the Harrisburg Pipe and Pipe Bending Co. and identified with the iron trade for almost 40 years, died at the Penn-Harris Hotel, Harrisburg, May 14, after a short illness with pneumonia, aged 58 years. After receiving his preparatory education in the Harrisburg Academy, Harrisburg, and the McClellan Institute, West Chester, he was graduated from the University of Pennsylvania in 1882 with the degree of Bachelor of Science. He immediately associated himself with his father, William T. Hildrup, in the management of the Harrisburg Car Mfg. Co. In 1890 when serving as secretary of the company, he resigned and with H. Jervy Patton and David E. Tracy, organized the Harrisburg Pipe and Pipe Bending Co.

JOHN H. HENDY, for the last 14 years president and general manager Joshua Hendy Iron Works, Sunnyvale, near San Jose, Cal., died at his home there following an apoplectic stroke. Mr. Hendy, up to the moment he was stricken, had been in the best of health. Mr. Hendy, who was 59 years old, was born in Pennsylvania and went West as a boy, having his first employment in the old Joshua Hendy Iron Works, founded by his uncle, the late Joshua Hendy, in San Francisco. At the time of his uncle's death Hendy, with a brother, inherited the business, of which he has since been the head. For 25 years Hendy was prominently identified with the National Guard of California and was a major in the old First Regiment. Later he was appointed to the staff of Governor Pardee and commissioned a colonel.

WILLIAM OESTERLEIN, president and treasurer Oesterlein Machine Co., Colerain Avenue, Cincinnati, died at his home in that city last week. He had been ill for several months. He was one of the oldest machine tool manufacturers in Cincinnati, having begun the manufacture of a patent clutch in 1886. In 1892 he built the first milling machine turned out in Cincinnati. In 1889 he moved his factory to Spring Grove Avenue, and in 1918 built the present plant. During the war, Mr. Oesterlein furnished the French and Belgian governments with a large number of their milling machines. He was 72 years old, and leaves a widow, two sons, Charles D. Oesterlein, vice-president and secretary of the Oesterlein Co., and Adolph Oesterlein, and four daughters.

FRANK J. BECKER, president and general manager New Foundry Appliance Co., Trenton, Ohio, and inventor of the Becker molding machine, died in Hamilton, Ohio, May 14, after an illness of two weeks. He was 56 years old and was for 15 years superintendent of the Peerless Foundry, Hamilton.

WILLIAM BUCHANAN, founder and president Appleton Wire Works, Appleton, Wis. died May 11, aged 77 years. He was a native of Scotland and came to America when five years old, later joining the DeWitt Wire Cloth Co. He pioneered the Fourdinier wire industry in the Middle West, going to Appleton in 1896 from the Cheney-Bigelow Wire Works at Springfield, Mass.

WILLIAM CHAMBERS MEYERS, sales manager of the Earle Gear & Machine Co., Philadelphia, died in the Germantown Hospital, that city, on Monday, May 3, after a brief illness. During the war, Mr. Meyers served as captain in the ordnance department, United States Army. He was in his fortieth year. Funeral services and interment were at his old home, Columbia, Pa.

HARRY E. KUNZMAN, president Columbus Structural Steel Co., Columbus, Ohio, was killed instantly on May 8 when an automobile in which he was riding was struck by a Columbus, Delaware & Marion freight car at Stratford, Ohio. Mr. Kunzman was 45 years old.

JOHN E. WILLIAMS, secretary and treasurer Pennsylvania Smelting Co., died at his home in Carnegie, Pa., on Thursday, May 13, after an illness of about six months. For some years he was chemist of the Iola Zinc Co., Iola, Kan. He was a member of the Chamber of Commerce, Pittsburgh, the Duquesne Club, and the Thornburg Country Club.

ROYAL A. CATE, Brown & Sharpe Mfg. Co., Providence, R. I., died of pneumonia at the home of his daughter, Mrs. Arthur L. May, Providence, May 7. Mr. Cate was a sales representative for the Brown & Sharpe concern for 26 years. He was born at Ballard Vale, Mass., in 1845.

JAY S. YOUNG, production manager Detroit Foundry Co., Detroit, died recently following an operation.

As illustrating the difficulties of transportation resulting from the railroad strike, a towboat with five barges recently arrived in Cincinnati from St. Louis, having 400 automobiles as freight. These automobiles were shipped from Detroit to Chicago by water, thence to St. Louis and from there to Cincinnati. On the return trip the same towboat took a shipment of 200 cars to Memphis, Tenn.

DETROIT SEES CHANGE

Buyers Having Their Turn as Demand for Some Products Declines

DETROIT, May 15.—Evidences of a change in the situation with regard to manufactured steel products, especially in the automotive field, appear to be widespread in Detroit, according to purchasers of those products. For a long period the buyer of these articles has been rather at the mercy of the seller, but within the week, it is said the situation has gone far toward a reversal. At any rate, companies that have been long loaded up with orders far in advance have been approaching buyers with offers to ship materials at once, or nearly so, on orders calling for deliveries next month and even the month after.

Coupled with this changed attitude on the part of manufacturers is the fact that an upward trend is again observable in the number of unemployed workmen in the city and industrial district.

Whether this condition is due merely to the fact that the last vestiges of freight embargoes have been removed from shipments in and out of Detroit by rail within the past day or so, or whether it is due to the cancellation of a large number of orders by purchasers who prefer to wait a while and place new orders following a confidently expected fall in prices, remains a matter for speculation. That it may be due to a combination of both is indicated by the general feeling that prices must soon decline and by the fact that at present empty freight cars are more easily procurable than for many months.

It is rumored that many of the larger plants are planning to put through substantial wage decreases within a few weeks, in the case of one of the largest automotive corporations it being said that the wage cut will be at least 20 per cent. While a majority of factories now are maintaining virtually complete forces, it appears that production, as a general thing, stands at about 60 per cent.

Thompson Properties Sold

UNIONTOWN, PA., May 17.—Sale of the J. V. Thompson coal lands and other properties was concluded by the trustees in bankruptcy last week, when two checks, one for $4,000,000 and the other for $500,000, were turned over to the trustees by the Piedmont Coal Co., purchaser. In addition the Piedmont Coal Co. has paid $1,000,000 to West Virginia unsecured creditors and assumes first mortgages and other secured credits of between $16,000,000 and $20,000,000. It is stated authoritatively that the Piedmont Coal Co. will begin payment of the secured indebtedness during the next week, thus releasing upwards of $16,000,000, mostly to individual creditors in western Pennsylvania counties and a part of West Virginia.

Export Opportunities

P. Poliakoff, 62 Holbrook Viaduct, London, E. C., I. (England), has written to THE IRON AGE requesting information from American manufacturers of machinery for making bolts and nuts, railroad dog spikes, etc. He desires the most modern machines and methods by which it may be possible to introduce in England needed improvements in the manufacture of these products. Copies of Mr. Poliakoff's letter giving complete information as to his requirements may be obtained from THE IRON AGE.

Societa Anonima Acciaierie e Ferriere Lombarde (Iron and Steel Works of Lombardy), Milan, Italy, has written to THE IRON AGE advising that it is in the market for complete wire drawing machinery for iron and steel; also large quantities of soldered pipes, steel yard equipment, rolled stock, etc., and requests offers as soon as possible, with guarantee of delivery.

Effective May 1, O. O. Hewitt resigned as secretary and treasurer of the Niles Forge & Mfg. Co., Niles, Ohio, after eight years' service.

Charles M. Schwab Addresses American Zinc Institute

"There are thousands of contented workmen in this country who enjoy a happiness that the owners of palaces can never have," said Charles M. Schwab in an address before the American Zinc Institute at Chicago on May 10. His remarks were occasioned by statements made by the preceding speaker, Whiting Williams, formerly of the Hydraulic Pressed Steel Co., who recently worked for seven months in labor gangs and voiced the opinion that the present unrest could be traced to long hours, intermittent employment and improper living conditions. Although Mr. Schwab admitted that Mr. Williams' conclusions might be correct as regards some industries, he denied their general application. He recalled the fact that he himself had been a laborer, not because he wanted to make an investigation but because he had to earn his bread. This early experience, he believed, gave him a good notion of the psychology of the working masses. At present, he is probably the largest employer of labor in the world, having 190,000 employees in plants he owns or controls. Yet he has never had to contend with unions or serious labor trouble.

The principal topic of Mr. Schwab's address was the value of organization and cooperation in the zinc industry. From what he could learn, he stated the zinc industry never paid a fair return on the investment for the risk involved. There is room for improvement in the direction of more economical and profitable operation and greater cooperation to that end.

Among others who addressed the convention were Capt. Robert W. Hunt, R. W. Hunt & Co., Chicago; George C. Stone, the New Jersey Zinc Co., who discussed differences in European and American zinc smelting practices; C. E. Siebenthal, United States Geological Survey, who spoke on the zinc pigment industry; Arthur Thacher, the New Jersey Zinc Co., whose subject was mine taxation; and L. E. Wemple, the American Zinc, Lead & Smelting Co., who delivered an address on the manufacture of zinc oxides for pigment purposes.

The Zinc Institute was in session in the Congress Hotel, Chicago, on May 10 and 11. The National Pipe and Supplies Association also held its annual convention there on the same dates.

Amendment of Alien Labor Law Favored

Believing that the shortage of labor is indirectly, if not directly, responsible for the high cost of living, labor unrest, strikes and labor disturbances, decreased production and all forms of radical agitation, the executive committee of the National Association of Sheet and Tin Plate Manufacturers, representing 70 per cent of the manufacturers of sheet steel in the country with an annual capacity of 2,750,000 tons, adopted a resolution on May 4, at Pittsburgh, endorsing the action of the inter-racial congress on April 7 recommending amendment of the alien labor law. The amendment would permit our consular agents abroad to advise intending immigrants of the opportunities for employment in this country, the wages paid and the localities where there is a labor shortage.

The members of the Cincinnati Employment Managers' Association, at a meeting held in the Chamber of Commerce last week, elected the following officers for the ensuing year: President, George Halsey, Cincinnati Milling Machine Co.; vice-president, P. A. Boyle, Procter & Gamble Co.; secretary-treasurer, Raymond Lewis, Ault & Wiborg Co.; directors, Ed Walton, Jr., Cincinnati Ball Crank Co.; Harvey Tuttle, Pollak Steel Co.; L. J. Zoeller, Procter & Gamble Co., and A. M. Boulware, of the Chamber of Commerce.

City electricians of Hamilton, Ohio, who have been on strike for an increase of wages from 69½c. an hour to 85c., have been granted the increase and have returned to work. The line foreman was increased from 85c. to 99½c.

Machinery Markets and News of the Works

LITTLE DEMAND FOR TOOLS

Business Falls Off Owing to Shipping Congestion

Chesapeake & Ohio Railroad Wants Over 40 Machines and Amoskeag Mfg. Co. Has Issued List

The conviction that railroad transportation difficulties will not be speedily overcome is no doubt responsible for the falling off in machine tool trade in the past two weeks. The slump has become more pronounced in the past week, there being few inquiries or orders in any of the principal selling centers.

It is now apparent that railroad transportation will be for some time the "neck of the bottle." Manufacturing and other business activities will necessarily be no greater than the capacity of the railroads to handle the traffic. The probable issuance of priority orders for freight this week by the Interstate Commerce Commission will be watched with interest, as it will be a constructive step in the unraveling of the traffic snarl. During the operation of priority shipping some industries, however, may be restricted in their production.

The Chesapeake & Ohio Railroad has come into the market for more than 40 tools, mostly punches and shears, pipe machines and engine lathes; other railroad lists are pending. No purchases have been made as yet by the Norfolk & Western Railroad against its recent list of about 70 machines.

The Amoskeag Mfg. Co., Boston, has issued a list of 18 tools.

An Indiana manufacturer of engine lathes has advanced prices 10 per cent and an Ohio line of lathes has gone up 10 to 15 per cent. Some in the trade believe in calling a halt in rising prices, but one dealer who predicted the next change in price would be a reduction received notice of an advance.

New York

NEW YORK, May 18.

Aside from the list of the Chesapeake & Ohio Railroad for some 40 machines, which few in this market can quote on, machine-tool inquiry in the past week has been almost nil. The market has not had such a quiet week in many months. Orders, too, are few and far between. The railroad tie-up and the credit situation are without doubt largely responsible for the slump in machine-tool trade. Sellers say that users of tools are willing to buy, but do not see anything to be gained in placing orders when shipments are so uncertain. Some of the machine-tool plants are making better shipments than they were a few weeks ago, but the situation is far from satisfactory. Just what effect the priority arrangement to be put into effect by the Interstate Commerce Commission will have no machinery it is now too early to determine. Food and fuel are to be given preference, according to reports from Washington; other essential freight will be taken care of in all probability in the order of its importance.

Sales of electric cranes are light and chiefly for those of small capacity. On the other hand, manufacturers of hand-power cranes are booking numerous orders. Inquiries for locomotive cranes are few. The United Electric Light & Power Co., New York, inquiring for a 110-ton and a 75-ton overhead traveling crane for its Hell Gate Station through Thomas E. Murray, consulting engineer, 55 Duane Street, New York, has again revised the specifications. The Brooklyn Rapid Transit, 85 Clinton Street, Brooklyn, is in the market for a 15-ton and a 5-ton overhead traveling crane, span about 50 ft. Other inquiries include: Melchior, Armstrong & Dessau, exporters, 116 Broad Street, a hand-power crane with two 10-ton trolleys, 46-ft. span; Hamilton & Hansell, 13 Park Row, New York, an 8-ton, 18-ft. 6-in. span overhead traveling crane; Day & Zimmerman, Philadelphia, a 20-ton, 48-ft. span overhead traveling crane; the Yukon Gold Co., 120 Broadway, New York, a 10-ton, 23-ft. 3-in. span hand-power crane.

Recent sales include: The Pittsburgh, Cincinnati, Chicago & St. Louis Railroad, a 250-ton, 8-motor overhead traveling crane from the Morgan Engineering Co.; the Johnson & Thomas Steel Co., Pittsburgh, two 15-ton overhead traveling cranes, the Haywood Tire & Equipment Co., Indianapolis, Ind., a 5-ton, 39-ft. span overhead traveling crane, the du Pont Engineering Co., Philadelphia, a 4-ton grab bucket crane, ¾-yd. capacity, the John C. Vance Iron & Steel Co., Chattanooga, Tenn., a 2-ton, 35-ft. 3-in. span transfer crane, the General Electric Co., Pittsfield, Mass., a 2-ton, 3-motor, 13-ft. span overhead traveling crane and the Pacific Fruit Express Co., Roseville, Cal., twelve 1-ton, 27-ft. to 44-ft. span single I-beam cranes, all from the Shepard Electric Crane & Hoist Co.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, is completing plans for the erection of a new plant on Grand Street, to cost about $100,000. W. Whitehill, 32 Union Square, New York, is the architect and engineer.

The Improved Corrugating Machine Builders, Inc., New York, has been incorporated with a capital stock of $100,000 by S. Saperston, A. J. Ebeling and M. Sherrick, 7 Wall Street, to manufacture special machinery and parts.

The New York Steel Exchange, Inc., Woolworth Building, New York, has increased its capital stock from $10,000 to $110,000.

The Staten Island Garage, Inc., 369 Van Duzen Street, Tompkinsville, S. I., has had plans prepared for a one- and two-story service and repair building, 99 x 207 ft., at Bay and Congress streets, Stapleton, to cost about $45,000.

Machinery and mechanical equipment to cost about $300,000, will be installed at the new plant of J. M. Huber, 602 Sixty-second Street, Brooklyn, manufacturer of colors, at Swartz, La. The Hope Engineering Co., Mount Vernon, Ohio, is the engineer.

The Universal Iron Foundry and John F. Pitz, Inc., 21 Rose Street, New York, have been merged with the Pitz & Weber Iron Foundry, at the same address. The company also operates a brass foundry.

The Gibralter Tire & Rubber Co., 234 Fourth Avenue, New York, has awarded contract to R. Addito, Weehawken Heights, N. J., for a new one- and two-story plant, 88 x 142 ft., at the Hudson County Boulevard and Thirteenth Street, West New York, N. J., to cost about $60,000.

The property secured by the Automatic Straight Air Brake Co., 14 Wall Street, New York, at Twenty-fifth Street and Eleventh Avenue, will be used for the manufacture of air brakes, and machinery and tools will be assembled at once. The board of directors has been increased from 9 to 11, and including Harry B. Hunt, formerly connected with the American Locomotive Co., and Archibald M. McCrea, at one time associated with the Union Spring Co., Pittsburgh.

The Western Electric Co., 195 Broadway, New York, has awarded contract to the Turner Construction Co., 244 Madison Avenue, for its proposed 10-story, reinforced concrete and steel building, 200 x 200 ft., and 323 x 340 ft., at Greenwich and Clarkson streets, to cost about $2,500,000.

The Highgrade Toy Mfg. Co., Long Island City, N. Y., has leased the building on Jamaica Avenue, near Sherman Street, 100 x 100 ft., recently completed, for the establishment of a new plant.

The Johnson Shipyards Corporation, 2941 Richmond Ter-

race, West New Brighton, S. I., has acquired 152 x 171 ft., at Van Pelt Avenue and the tracks of the Staten Island Rapid Transit Co., to be used in connection with its works.

The Triplex Safety Glass Corporation of America, 60 Broadway, New York, manufacturer of lenses, etc., has increased its capital stock from $10,000,000 to $20,000,000. Its plant is at Mount Vernon, N. Y.

The Fred Goat Co., Inc., 8 Reade Street, New York, manufacturer of machinery parts, etc., has acquired the three-story brick factory at 312-20 Dean Street, Brooklyn. It will be used by the new owner as a machine works at an early date.

The Theurer Wagon Works, New York, has been incorporated with a capital stock of $50,000 by H. and C. Steinka and P. H. Mellmer, 140 Nassau Street, to manufacture wagons, parts, etc.

The State Legislature, Albany, N. Y., has made appropriations for new power plants at public institutions as follows: Power house at the State Hospital, Buffalo, $75,000; similar plant at the State Hospital, Central Islip, $60,000, and power plant at the State School for Mental Defectives, Rome, $75,000.

The Hamilton Motors Co., New York, has leased the seven four-story buildings at 1981-87 Broadway and West Sixty-seventh Street for 21 years, as a site for an automobile works. Adolph Picken heads the company.

The New Jersey Power & Light Co., Dover, N. J., has been granted permission by the Board of Public Utility Commissioners to issue bonds for $152,000 and stock for $100,000, the proceeds to be used in part for improvements, extensions, etc.

The Ferracute Machine Co., Bridgeton, N. J., manufacturer of metal working presses, dies, etc., has increased its capital stock from $200,000 to $500,000.

The Foundry Co. of New Jersey, 24 Fairview Place, Orange, N. J., has been incorporated with a capital stock of $250,000 by Goodwin Block, New Rochelle, N. Y.; E. C. Rohman and Charles L. Constant, Jr., Orange, to manufacture iron and steel products.

In connection with its new motor truck plant at Bloomfield, N. J., the American-La France Fire Engine Co., Elmira, N. Y., has completed plans for the erection of a power plant on Brookside Place, for works service, to cost $75,000.

The Dwight & Lloyd Sintering Co., 29 Broadway, New York, has acquired the plant of the New Jersey Arnold Damper Co., near Stanhope, N. J., for the manufacture of mining machinery. Possession will be taken at once, and considerable heavy type machinery installed.

The Palisade Storage Battery Co., Englewood, N. J., has been incorporated with a capital stock of $25,000 by J. R. and B. M. Birsh and C. W. Headden, Yonkers, N. Y., to manufacture storage batteries, etc.

The Nutley Auto Body Co., 54 Washington Street, Nutley, N. J., has filed notice of organization to manufacture truck and automobile bodies. I. Sidna, 7 Stager Street, heads the company.

The Empire Cream Separator Co., Bloomfield, N. J., is planning for the erection of a new building, 50 x 150 ft., on Willow Avenue.

The Hoole Tool & Supply Co., Jersey City, N. J., has been incorporated with a capital stock of $125,000 by R. and C. H. Hoole, North Bergen, and P. W. Greceo, Jersey City, to manufacture tools, machinery, etc.

The White Metal Mfg. Co., 1006 Clinton Street, Hoboken, N. J., manufacturer of collapsible tubing, etc., is planning for the erection of a new brick and steel power plant, to cost about $60,000.

The Apex Electric Specialty Co., 77 Orange Street, Newark, N. J., manufacturer of electrical products, has increased its capital stock to $103,000.

The Manhattan Rubber Mfg. Co., Willet Street, Passaic, N. J., manufacturer of mechanical rubber products, is planning for extensions and improvements to cost about $30,000. The company has commenced the erection of a new rubber reclaiming plant at Montville, N. J., to cost in excess of $200,000.

The Accounting Machine Co., 238-48 Badger Avenue, Newark, N. J., is planning to add another building to its new works on Badger Avenue, near Runyon Street, ground for which will soon be broken. The first building will be two stories, 81 x 111 ft., and will represent a total investment, including site, of about $200,000. It is planned to have this structure ready for occupancy early in August. The other building will be either two or four-stories, of brick, steel and concrete. A plant has been in operation at Grand Rapids for the manufacture of special tools, jigs, dies, parts, etc., and this will be removed to the Newark works. John J. Harris is president, and Daniel H. Connor, vice-president, will be in charge of production. It is said that orders on hand insure capacity operations for many months.

The Burnrite Coal Briquette Co., 543 New Jersey Railroad Avenue, Newark, N. J., manufacturer of fuel briquettes, has acquired property adjoining its works, for use in connection with its plant.

The American Pipe & Bending Co., Coit Street, Irvington, N. J., is having plans prepared for the first unit of its new plant near Chancellor Avenue. It will be 60 x 120 ft., brick, and is estimated to cost about $15,000. Strombach & Mertens, 1091 Clinton Avenue, Irvington, are the architects and engineers.

The Newark Steel Co., 260 Chadwick Avenue, Newark, has filed notice of organization to manufacture iron and steel products. Reginald R. Allen heads the company.

J. Ross & Co., Colt Street, Irvington, N. J., manufacturer of cutlery, drop forgings and other metal products, has awarded a contract to the Salmond Brothers Co., 526 Elm Street, Arlington, for three one-story additions, to aggregate about 9800 sq. ft. They will include a machine shop, drop forge works and heat-treating building. The company recently acquired a site, 100 x 150 ft., adjoining its present plant, for the extension.

The New Process Plating Co., 21 Prospect Street, Newark, has been organized to manufacture plating equipment. Harry E. Crowning, 126 Stephen Street, Belleville, heads the company.

The Brander Rubber & Tire Co., East Rutherford, N. J., has completed plans for a one-story power house addition, 50 x 60 ft. F. D. Brander is president.

Since the General Electric Co. assumed control of the Cooper Hewitt Electric Co., Hoboken, N. J., last June, its business has more than doubled. To meet the increased demand for industrial lighting outfits, as well as motion picture apparatus, the company recently purchased adjoining property, which will eventually more than double the present floor space.

The Mignon Mfg. Corporation, Austin Street, Newark, N. J., is being reorganized and will double its capital stock. It expects to build a new plant in the near future.

The Simmons Machine Co., 985 Broadway, Albany, N. Y., is building a new plant, and will organize a new company to manufacture machine tools and small tools.

The entire assets and good will of the Sears-Cross Co., Bush Terminal, Brooklyn, manufacturer of the Sears-Cross lock" for automobile doors, have been acquired by the National Seal Co., manufacturer of metal seals and automobile hardware, (present) with plants at Portland, Me., and Brooklyn. A new plant of the company in Brooklyn will be completed with additional equipment of modern automatic machinery for the production of locks in volume quantity to meet the demands of the motor car manufacturers and body builders for the company's products.

The Brust Hardware Co., Ticonderoga, N. Y., has been incorporated with a capital stock of $50,000 by F. L. and C. E. Brust and L. M. Barry to manufacture hardware, tools, etc.

The American Braiding Machine Co., Brooklyn, has been incorporated with a capital stock of $20,000 by W. Salmon J. and P. Semel, 1307 President Street, to manufacture machinery and parts.

The Hamblin & Russell Mfg. Co., Worcester, Mass., wire goods, has bought the building at 36 Murray Street, New York, which it will occupy in part. Arrangements have been made to move from 45 Cliff Street, New York, the firm's present location in that city.

New England

BOSTON, May 17.

A further decrease in sales is reported by machine-tool interests, due largely to the transportation situation. Construction projects in process and contemplation are held up because of the inability to get building material and production is curtailed as manufacturers are unable to obtain raw materials. The market is by no means at a standstill, however, and prices are very strong.

The Amoskeag Mfg. Co., Boston, cotton goods, has issued the following list: One No. 2 universal milling machine; one centering machine with 4-in. capacity; one 16-in. x 8-ft. engine lathe, with taper attachments; two 14-in. x 5-ft. engine lathes; one 14-in. x 8-ft. engine lathe, with taper attachments; one 16-in. x 8-ft. engine lathe, with taper attachments; one 18-in. x 8-ft. engine lathe, with taper attachments; one 22-in. x 12-ft. engine lathe; one 36-in. x 14 ft. engine

lathe (all above engine lathes back gear, power cross feed, compound rest; three 12 x 5-in. speed lathes; one 12 x 6-in. speed lathe; one 24-in. x 6-ft. turret chucking lathe; one Jones & Lamson flat turret lathe, 2 x 24 in.; one No. 1 turret lathe, with plain, automatic chuck and wire feed; one chucking lathe with 12-in. swing.

Electrical manufacturers are extremely busy, especially on motors, deliveries of which are extended. Many companies are in the market for machine tools, or have bought recently, but largely light equipment. The General Electric Co. has issued requests for prices on additional tools, including one 18-in. x 8-ft., one 16-in. x 7-ft. and one 24-in. x 12-ft. engine lathes, June delivery. The Holtzer Cabot Electric Co., Boston, is buying new and second-hand tools. The American Steam Gauge & Valve Co., Boston, is in the market for a No. 2 universal milling machine for its Worcester plant, and a Framingham manufacturer is considering the purchase of two additional radial drills. A New Hampshire machine shop has been unsuccessful in placing an order for six well-known lathes for delivery in 16 to 18 months, at prices ruling to-day. The Crompton & Knowles Loom Works, Worcester, has not bought the two lathes for which specifications were asked a week or more ago. The Boston & Albany Railroad is about to purchase a small drill, but no other New England railroad has come into the market.

The Boston Elevated Railway bought a 24-in. x 10-ft. geared engine lathe, and a local motion picture supply house a bench lathe with attachments costing close to $1,000. The Mead-Morrison Mfg. Co., Boston, coal handling machinery, has purchased second-hand turret lathes. The Fore River Shipbuilding Corporation, Quincy, Mass., has placed orders for a small amount of machine-tool equipment and parts for tools and cranes, subject to Government approval.

The General Electric Co., West Lynn, Mass., has inquiries out on one 25 or 30-ton crane and three or four smaller ones, but otherwise the market is flat. The Lombard Governor Co., Ashland, Mass., will construct a 3-ton crane for its new foundry, which is not expected to be in operation before July. Delivery of a fairly large crane to a New England railroad is held up by the non-delivery of a motor. The Palmer Foundry, Palmer, Mass., is in the market for a small crane. Its plant was recently burned, but temporary quarters have been erected and molding began May 17. Contract has been let for an all-steel structure, completion having been guaranteed by Aug. 1. Before the close of 1920 the company plans to install a small crucible furnace. A Sullivan machinery air compressor and molding machines have been bought.

The Russell Mfg. Co., Middletown, Conn., brake linings, webbing, etc., will sell its Higganum, Conn., plant, which has been idle for some time, to interests whose identity is withheld for the present.

The Automatic Aluminum Heel Co., Boston, has bought a four-story brick and stone building at 621-623 Albany Street, which will be razed, and about 12,220 sq. ft. of land, on which a six-story plant to cost about $300,000 will be erected.

The Framingham Screw Works, Framingham, Mass., is about to occupy its new Howard Street plant. Its Wellington Avenue plant, together with new machine tools, mechanical equipment, etc., is to be sold at public auction, in lots to suit purchasers.

Construction of the proposed new plant for the Greyhound Motors Co., Warren, R. I., is held in abeyance, pending a special town meeting called for the purpose of deciding on the company's right of way.

A salesroom, garage and service department, to be known as the Lewiston-Buick Building, corner of Main and Sabattus streets, Lewiston, Me., will be erected this summer, contract for the structural steel having been let to a Boston house.

Work has started on a building for the O. A. Miller Treeing Machine Co., at Cherry and Ford streets, Brockton, Mass. It will contain a machine shop, plating department and a large kiln.

The Fairhaven Mills, Fairhaven, Mass., cotton, is contemplating erecting a one-story addition to its machine shop.

Plans for a one-story foundry extension, 45 x 104 ft., for the Crosby Steam Gauge & Valve Co., Charlestown, Mass., have been completed, but will not be figured on at present.

The Boston Machinery Exchange, Boston, has bought the unused Government power and heating material at Nitro, W. Va., including valves, fittings and several hundred thousand feet of steam radiation.

The C. F. Church Co., Holyoke, Mass., toilet and bathroom supplies and accessories, has bought land in Brattleboro, Vt., where it will erect a brick and cement plant, 50 x 170 ft.

Work on the additions to the plant of the Fitchburg Grinding Machine Co., Fitchburg, Mass., is well under way.

Bids are being received by the General Electric Co., West Lynn, Mass., for adding a 150 x 180 ft. story to building 67.

Work has been started on the three-story addition, 66 x 146 ft., by the Central Oil & Gas Stove Co., Gardner, Mass.

Another addition, two stories, 38 x 101 ft., mill construction, will be built by the American Pin Co., Waterbury, Conn.

The Aberthaw Construction Co., Boston, is building a $1,000,000 power house and manufacturing plant for the Lowell Weaving Co., Lowell, Mass.

The Gillespie Air Craft Co., Boston and New York, a $1,000,000 corporation, organized under Massachusetts laws, has succeeded the Gillespie Air Craft Corporation, Cambridge, Mass., manufacturer of sport, passenger and sea planes, motors and accessories.

The Atlas Machine & Tool Co., Springfield, general machine shop, has been chartered with a capital stock of $20,000. John A. Peterson, 35 Amory Street, is president, and Helge Welin, 47 Silver Street, treasurer.

The Cylinder & Piston Co., Hartford, has been chartered with a capital stock of $50,000 to conduct a machine shop. F. L. Evarts, L. R. Spencer, J. F. Garrette and G. N. Kierstead are the incorporators.

William V. Baldwin is president and Henry F. Blanchard treasurer of the Metal Saw & Machine Co., Springfield, Mass., a $400,000 company organized to manufacture band saws and band saw machines, formerly produced by the Napier Saw Works, Inc., that city. The Napier works recently sold its hack saw business.

The Wico Electric Co., Springfield, Mass., within the near future will erect four monitor type, 50 x 200 ft., manufacturing buildings on land recently purchased in West Springfield.

The Rogers Drop Forging Co., Worcester, Mass., has awarded contract for three additional buildings at its Frank Street plant; a forge shop, monitor type, 50 x 131 ft.; one-story manufacturing building, 61 x 89 ft.; and a power house, 37 x 47 ft.

The Advance Furnace & Engineering Co., Springfield, Mass., capitalized for $200,000, has been chartered to manufacture gas and oil-fired metallurgical furnaces. William F. Scully, 32 Byers Street, is president, and John H. Keegan, Indian Orchard, treasurer; Walter A. Buechner, Pittsburgh, vice-president, and J. Frank Scully, South Amboy, N. J., assistant secretary and treasurer.

The Stanley Works, New Britain, Conn., has purchased the plants, properties and good will of the Stanley Rule & Level Co., plans for which were mentioned in these columns March 11. The business of the two companies will be carried on under separate names as heretofore.

The Mount Carmel Brass Co., Hamden, Conn., has awarded a contract to the Sperry Engineering Co., New Haven, for a one-story addition, 24 x 113 ft., to cost about $17,000.

In connection with the sale of its plant and equipment, the Hawthorne Mfg. Co., Bridgeport, Conn., manufacturer of automobile and motorcycle lamps, has arranged for the permanent suspension of business. It is said that the difficulty in securing raw materials and working conditions has brought about this action.

The Rowland Machine Co., New Haven, Conn., has filed notice of dissolution.

The New England Body Co., North Canaan, Conn., has been incorporated with a capital stock of $200,000 by C. H. Pease, J. C. Roraback and Allyn Fuller to manufacture automobile bodies.

The Crompton & Knowles Loom Works, Worcester, Mass., manufacturer of textile machinery, has increased its capital stock from $6,000,000 to $8,000,000.

Dragat & Toubman, 340 Windsor Avenue, Hartford, Conn., have had plans prepared for a three-story service building and repair works, 95 x 100 ft., in the rear of their present building.

The Vermont Milling Products Corporation, Fair Haven, Vt., recently organized to take over the mill and quarry rights of the Mahar Slate Products Co., is having plans prepared for an addition to double the present output. A new mill to cost about $500,000, including electrically operated equipment, will also be erected.

The Automatic Polishing Machine Co., New Haven, Conn., has filed notice of dissolution.

The Hope Rubber & Tire Co., Stamford, Conn., has been incorporated with a capital stock of $50,000 by M. H. Plainfield, Benjamin Yaraus and J. J. Fennel.

The Eastern Auto Body Co., Bridgeport, Conn., has filed plans for a one-story works on Lindley Street, 60 x 90 ft., to cost about $25,000.

The United States Cutlery Co., 208 Pond Street, Provi-

dence, R. I., has been organized to manufacture knives, cutlery, etc. A. W. Milner, 70 Corinth Street, heads the company.

The Norton Co., Worcester, manufacturer of abrasives and abrasive wheels, will double the capacity of its abrasive storage and abrasive milling department by the erection of a large building, dimensions of which have not yet been settled. The company produces the crude abrasive ore in its electric furnaces at Niagara Falls and ships it to Worcester for milling and graining. In the new building milling equipment will be installed, together with storage bins in the form of huge wooden cylinders, 40 ft. in diameter and 40 ft. high. Employment will be given to 100 additional men.

The Worcester Foundry Co., Worcester, will build an addition, 50 x 150 ft., which will practically double its capacity.

The Carlin Blower Co., Worcester, has moved from 72 School Street to 104 Harding Street, where it will enlarge its manufacturing capacity.

Philadelphia

PHILADELPHIA, May 17.

Prospects of the buying of machine tools by railroads furnish the one stir of activity in an otherwise dull market. The latest railroad inquiry is that of the Chesapeake & Ohio for about 40 tools for its machine shops in Richmond, Va. It is reported that this railroad recently arranged with New York bankers for the securing of $250,000, ostensibly for the purchase of these tools. The list includes a wide variety of machines, including lathes, drill presses, shapers, planers, milling machines and staybolt machines. The rumor persists that the Erie and the Pennsylvania railroads will put out lists before long.

The dullness which pervaded the week before in the other machine tool centers has struck the Philadelphia district as well. Even the automobile industries seem to have suffered, as the demand for cars is much less than had been anticipated. Some Philadelphia salesmen of cars report only 50 per cent of sales expected, attributing this slump to the general depression prevailing over the country, to the bad weather which has curbed motoring and to the unusually bad roads. Makers of cars and parts are therefore not expanding as had been anticipated. Shipyards in the district are by no means engaged in normal activity, some of those about Chester being either closed because of strikes or because of a recent failure of the power system. The Chester Shipbuilding Co., Chester, Pa., just bought a radial drill, a sensitive drill and a turret lathe and is asking for a shear.

The Stokes & Smith Co., paper box covering machines, Summerdale, Philadelphia, recently inquired for a considerable list of tools, and being a British concern, has submitted bids to the home office. Among the most likely buyers of machine tools are the Oswald Lever Co., Inc., Philadelphia, manufacturer of machinery and parts, which has just bought the two-and-three-story factory at Eleventh and Cambria streets, and the Atlantic Refining Co., Philadelphia, which has planned a machine and repair shop at Williamsport, Pa.

The Premier Motor Corporation of America, 810 Pennsylvania Building, Philadelphia, has just been incorporated for the manufacture of marine motors. Timothy O'Leary is president.

The Keystone Auto Top Co., 1420 Fairmount Avenue, Philadelphia, has completed plans for a four-story plant, 85 x 140 ft., at 1712-20 Fairmount Avenue, to cost about $175,000, including equipment. LeRoy B. Rothschild, 1225 Sansom Street, is architect.

The Ajax Metal Co., 46 Richmond Street, Philadelphia, has filed plans for extensions and improvements in its branch works on Orthodox Street, near the Delaware River, to cost about $25,000.

The Fiat Motor Co. of Pennsylvania, 1827 Chestnut Street, Philadelphia, has arranged for a long-term lease on a building to be erected at 2207-11 Chestnut Street, for a new service and repair establishment. Plans for the structure have been prepared by LeRoy B. Rothschild, architect, 1225 Sansom Street.

The Auton Boat Co., 407 Schubert Building, Philadelphia, is having plans prepared for a new one-story works, 250 x 500 ft., on Audalusen Street, for general manufacture and assembling. E. S. Nopolis is president.

The Universal Motor Agency, 3438 Ludlow Street, Philadelphia, has commenced the erection of a two-story and basement service and repair building, 95 x 215 ft., on Chestnut Street, near Thirty-fourth Street, to cost about $125,000.

A one-story machine shop to cost about $20,000 will be erected at Tenth and Westmoreland streets, Philadelphia, by the Surpass Leather Co., 901 Westmoreland Street.

A one-story power plant with initial capacity of about 1200 hp. will be erected by Frank Schoble & Co., Philadelphia, at their hat works at Tenth and Oxford streets.

The Monarch Mfg. Works, Inc., 3129 Emery Street, Philadelphia, machine products, has awarded contract to A. E. Barnes & Co., Twentieth and Pacific streets, for a one-story addition, at the corner of Westmoreland and Salmon streets.

The Camden Steel Works, Camden, N. J., has been incorporated for $100,000 by James Konnolly, A. T. Culbertson and H. J. Koehler, to manufacture iron and steel products.

The Sprinkler Equipment Co., Camden, N. J., has been incorporated for $100,000 by William B. Griffiths, Frank T. Ray and Gordon E. Bull, to manufacture fire extinguishers, sprinklers, etc.

The Graham Roller Bearing Co., Coudersport, Pa., is planning for a one-story addition, 30 x 100 ft.

The Hunter Motor Car Co., Harrisburg, Pa., recently incorporated at $1,000,000 to manufacture pleasure automobiles, has acquired about 21 acres on the Gettysburg Pike, in the White Hill district. Preliminary plans for the buildings are now being prepared. C. H. Hunter, formerly with the Elliott-Fisher Co., at its local plant, is president and Simon E. Miller, formerly with the Bethlehem Steel Co., treasurer.

The Electric Sun Co., Easton, Pa., has been incorporated at $44,000 to manufacture outdoor electrically operated displays. Seymour D. Garrett, Asbury Park, N. J., is treasurer.

The Freeland Automobile & Foundry Co., Freeland, Pa., recently organized, has acquired the plant of the Freeland Foundry & Machine Co. for the manufacture of automobile engine pistons and similar specialties.

The Aldrich Pump Co., Allentown, Pa., has broken ground for extensions to its plant on Allen Street, comprising a one-story machine shop, 42 x 60 ft., and one and two-story brick additions, 33 x 100 ft. and 66 x 114 ft., respectively. The structures will cost about $40,000.

The Vulcweld Tire & Rubber Co., Pottstown, Pa., has been incorporated at $100,000 to manufacture automobile tires. Earle W. Smith, Hanover Apartments, is treasurer.

The Keeley Stove Co., Columbia, Pa., manufacturer of stoves, ranges, etc., is having plans prepared for a new plant to cost about $35,000. Horace Detwiler is president.

The Birdsboro Foundry & Machine Co., Birdsboro, Pa., has taken bids for an addition to its plant.

The National Bobbin Works Co., Allentown, Pa., has been organized to manufacture textile equipment. W. C. Senger heads the company.

The Spicer Mfg. Co., Keim Street, Pottstown, Pa., manufacturer of automobile axles, universal joints, etc., is planning for a one-story machine shop to cost about $50,000.

The Borough Council, Catasauqua, Pa., is planning for the electrification of the municipal waterworks, installing electrically operated equipment to replace the present steam-driven apparatus. Estimates are now being made.

The Reading Bottle Stopper Works, 238 South Sixth Street, Reading, Pa., has awarded contract to Howard J. Flick, 1032 Washington Street, for a three-story and basement plant, 80 x 104 ft., on Pearl Street, near Spruce Street, to cost about $30,000.

The Lebanon Steel Foundry Co., Front and Lehman streets, Lebanon, Pa., has completed plans for a three-story addition, 50 x 112 ft., to cost about $30,000.

The Keystone Motor Car Co., Columbia, Pa., is taking bids for a service and repair building at Second and Chestnut streets, 100 x 120 ft., estimated to cost $25,000. Frederick Schlotthaner heads the company.

Sotter Brothers, Inc., West High Street, Pottstown, Pa., manufacturer of boilers, tanks, etc., has construction under way on a one-story addition, 95 x 120 ft., to cost about $100,000.

The Ajax Electrothermic Corporation, Trenton, N. J., has been incorporated to take over the manufacture of the Ajax-Northrup high frequency furnace from the Pyrolectric Instrument Co. and the Northrup patents from the Ajax Metal Co., Philadelphia. The new corporation will have its offices and works in the old home of the Pyrolectric company, 636 East State Street, Trenton, the latter company continuing the manufacture of pyrometers and instruments in other quarters at the same address. The officers are: President, G. H. Clamer; vice-president and technical advisor, E. F. Northrup; treasurer and works manager, H. F. Porter; secretary and sales manager, Dudley Willcox. The Ajax Electrothermic Corporation is controlled by the Ajax Metal Co.

The McKneat Mfg. Co., organized under the laws of Pennsylvania, has leased a factory building at Easton, Pa., for manufacturing the McKneat line of oil burners and equipment. The officers are: C. P. Astrom, president; E. R.

Euston, vice-president; W. I. Gassert, secretary; A. J. McVay, treasurer; A. A. Neave, chairman board of directors.

The Bethlehem Motors Corporation, Allentown, Pa., is erecting new buildings on a site adjoining its present plant and will spend $1,363,000 in additions and equipment this year. By August it is expected that the production will have reached in excess of 20,000 vehicles per year.

The Hatboro Foundry Co., Hatboro, Pa., has been incorporated with a capital stock of $50,000 to manufacture iron and steel castings. Albert E. Koch, Jenkintown, is treasurer.

The foundry of the Gross Mfg. Co., West Hazleton, Pa., was recently destroyed by fire with a loss of $25,000. It will be rebuilt, it is understood.

Baltimore

BALTIMORE, May 17.

The Flynn & Emrich Co., 305 North Holliday Street, Baltimore, machinist, has increased its capital stock from $160,000 to $250,000.

The Baltimore Copper Smelting & Rolling Co., Fifth Avenue, and the B. & O. Railroad, Canton, Baltimore, will build a one-story steel and brick mill at Third Avenue and First Street, 204 x 330 ft. to cost $130,000.

The Piedmont Sundries Co., Charlotte, N. C., will build a two-story machine shop to cost $15,000.

Prices on steam hoists are wanted by R. K. Stewart & Son, High Point, N. C.

The Bridges Machine Co., Florence, N. C., recently incorporated with $10,000 capital stock, has been organized with T. H. Foss, president; W. H. Hudgins, vice-president, and G. N. Latham, secretary and treasurer.

The Southern Implement Mfg. Co., Columbus, Ga., has been incorporated with $70,000 capital stock and plans to establish a factory to manufacture picking machinery. The officers are W. T. Spaugh, president and treasurer; J. L. Harrington, vice-president, and J. F. Spaugh, secretary.

The Duval Foundries, Jacksonville, Fla., has been incorporated with $10,000 capital stock. A. T. Hill is president.

Te Delion Tire & Rubber Co., 131 Mount Royal Avenue, Baltimore, is completing plans for its new plant to cost about $150,000, comprising a one-story structure, 90 x 400 ft., and two-story building, 60 x 70 ft. J. Osborne Hunt, 114 North Montgomery Street, Trenton, N. J., is the architect.

The Baltimore Tube Co., Wicomico and Ostend streets, Baltimore, manufacturer of seamless brass tubing, has arranged for a note issue of $500,000.

The War Department, Washington, D. C., has arranged for the establishment of an ammunition arsenal on the site of its present proving grounds at Aberdeen, Md., to be known as the Aberdeen Ammunition Arsenal. A measure has been placed before Congress providing for an appropriation of $5,500,000 for this purpose, funds to be derived through the sale of the Government plants at Nashville, Tenn., Tullytown, Pa., and Amatol, N. J. The Aberdeen works will include all features of ammunition production, buildings to be equipped for explosives and propellants; metal working, for shell, fuse and booster manufacture; assembling operations and general service, including electric power plant, waterworks, housing, etc. The proposed plants will have a daily capacity of about 10,000 lbs.

The Lanyi Engineering Corporation, Dover, Del., has been incorporated with a capital stock of $25,000 by L. Lanyi, John B. Hutton and M. A. Behen, to manufacture boilers, engines, etc.

The C. H. Turner Foundry Co., Statesville, N. C., is planning for the erection of a new one-story foundry, 40 x 50 ft., to cost about $10,000.

The Divver Roofing Co., Anderson, S. C., manufacturer of metal roofing, etc., is arranging for the erection of a one-story plant, 48 x 100 ft.

The Latta-Martin Pump Co., Hickory, N. C., has increased its capital stock from $50,000 to $200,000.

The Seminole Fertilizer & Oil Co., Duval Building, Jacksonville, Fla., is having plans prepared for a new three-story plant, 70 x 200 ft., in the vicinity of Cayce, S. C., to cost about $300,000, including equipment.

The Blackburn Mill Mfg. Co., West Jefferson, N. C., has been incorporated with a capital stock of $100,000 by B. C. Waddell, Grassy Creek, N. C., and B. E. Reeves, Laurel Springs, N. C., to manufacture mill machinery and parts.

The Kleiber Motor Truck Co., 1480 Folsom Street, Atlanta, Ga., is having plans prepared for a new plant, with main building, one-story, 90 x 250 ft. The initial works are estimated to cost about $65,000, and will be equipped for the production of motor trucks from 1 to 5-ton capacity. Paul Kleiber is president.

Rich Brothers, 7-11 East Pratt Street, Baltimore, are in the market for an automatic wood-working turning lathe to take up to 36 in., a three drumroller feed sander, dowel machine for making dowels from 3/16 in. up to 1¼ in., 16 in. lathe and a 12 in. shaper, all to be used machines, rebuilt and in good condition.

Buffalo

BUFFALO, May 17.

The Columbus McKinnon Chain Co., Fremont Street, Tonawanda, N. Y., manufacturer of chains, has awarded a contract to Morris & Allen, Builders' Exchange, Buffalo, for an addition to its plant.

The Porter Products Corporation, Syracuse, N. Y., has been incorporated with a capital stock of $200,000 by G. G. Porter, W. H. Hafermalz and C. F. Abel, to manufacture machinery, automobile parts, etc.

The Rome Brass & Copper Co., Rome, N. Y., has increased its capital stock from $1,600,000 to $5,000,000.

Borgeson & Davern, Industrial Building, Syracuse, N. Y., machinery and tools, have changed their name to the Borgeson Tool & Machine Co.

The Depew & Lancaster Light, Power & Conduit Co., Lancaster, N. Y., has arranged for a note issue of $100,000 for extension in its power plant and system. Application was made recently to the Public Service Commission to make additions and betterments to cost about $250,000.

The Eagle Wagon Works, South Division Street, Auburn, N. Y., manufacturer of dump wagons, parts, etc., has increased its capital stock from $150,000 to $600,000.

The Empire Gas & Electric Co., Geneva, N. Y., has increased its capital stock from $1,250,000 to $4,000,000. It is planning for improvements to cost in excess of $300,000, and proposes to arrange a bond issue of this amount. Considerable new equipment will be installed, including compressors and system of coke handling apparatus, stokers, etc.

The Anderson Hardware Co., Norwich, N. Y., has been incorporated with a capital stock of $25,000 by R. A. Blake, R. B. and G. W. Anderson, to manufacture hardware specialties, plumbers' supplies, etc.

The Cattaraugus Cutlery Co., South Street, Little Valley, N. Y., manufacturer of cutlery, etc., has increased its capital stock from $100,000 to $1,000,000.

The Rome Mfg. Co., Railroad Street, Rome, N. Y., manufacturer of copper and brass goods, has increased its capital stock from $850,000 to $3,000,000.

The Simpson-Walther Lens Co., Rochester, N. Y., has increased its capital stock from $125,000 to $250,000.

The new building now being erected by the Ball Engine Co., Twelfth and Cranberry streets, Erie, Pa., manufacturer of steam engines, will be equipped as a machine shop. It will be one story, 135 x 200 ft., and is estimated to cost about $75,000.

Fire, May 6, destroyed a portion of the plant of the Linde Air Products Co., 1681 Fillmore Avenue, Buffalo, with loss reported at $100,000.

The Rand Co., North Tonawanda, N. Y., manufacturer of metal filing and recording systems, has awarded contract to Morris & Allen, Builders' Exchange, Buffalo, for a two-story addition, 60 x 200 ft., on Goundry Street.

The Dittmer Corporation, Lockport, N. Y., manufacturer of gears, is raising its capitalization from $175,000 to $340,000 and has increased its paid-in capital from $111,000 to approximately $211,000.

Chicago

CHICAGO, May 17.

With little change in the transportation situation and the added obstacle to deliveries in the form of a strike in the plants of Cincinnati tool manufacturers, market activity has shown no sign of reviving. Some business, however, is being closed and sellers are gradually learning new ways of working shipments through the railroad tangle, but on the whole buying is far below the level of the first three months of the year. Of existing inquiry, the demand for heavy tools is probably larger than for lighter equipment. The railroads have not yet taken any action on their lists, but the Burlington, it is said, will definitely close on its inquiry this week. The Santa Fe, which was expected to issue an extensive list, has thus far sent out only the following small inquiry: One 15-in. sensitive drill press, capacity 1/16-in. to

½-in. spindle; two single-spindle 20-in. upright drill presses, and one three-spindle upright drill press.

Two additional price advances are noted. An Indiana manufacturer of engine lathes raised his list 10 per cent, effective May 10, and an Ohio line of lathes went up 10 to 15 per cent, effective May 1.

The Great Lakes are being resorted to more extensively by Eastern makers of machines. One consignment of machine tools was recently moved by boat from Buffalo to Kenosha, Wis.

William J. Hughey & Son, automobile body builders, 2518 Michigan Avenue, Chicago, have purchased from the Magnetic Motors Corporation a lease on a four-story and basement building at 2517-21 Cottage Grove Avenue, containing 70,000 sq. ft. of floor space.

The Magnetic Motors Corporation, 2517 Cottage Grove Avenue, Chicago, has purchased a tract, 113 x 418 ft., on Thirty-fourth Street between Cottage Grove and Rhodes avenues and will erect a one-story factory to cost $150,000. Construction will begin next month.

The Garland McCarthy Foundry Co., 3307 South Lawndale Avenue, Chicago, has let a contract to the Austin Co., Cleveland, for a two-story foundry and storage building, 540 x 613 ft.

The Rockford Malleable Iron Works, Rockford, Ill., has let contract to the Austin Co., Cleveland, for two one-story structures, 90 x 120 ft. and 150 x 200 ft., to cost $150,000.

The Elgin Machine Works, 267 North State Street, Elgin, Ill., has been incorporated with $10,000 capital stock by Oscar Ludwig, Martin Skok and Arthur J. Steinke to manufacture farm implement and automobile parts.

The Modern Iron Works, Quincy, Ill., has bought the property of the Sheridan Stove Co., which suspended operations 16 months ago. It includes a foundry, 100 x 200 ft., and a six-story warehouse, 60 x 100 ft.

The Channon-Emery Stove Co. has resumed operation in its foundry at Quincy, Ill., after a shutdown of three months, pending the installation of a new cupola.

The Indiana Aluminum Ware Co., Elkhart, Ind., which recently completed a $150,000 plant, has commenced operation.

The Rockford Drop Forge Co., Rockford, Ill., will remodel its plants at 1416 and 1417 Twentieth Avenue.

The Sitka Tire Core Co., Perry, Iowa, has purchased a factory site between Fourth and Fifth streets, abutting on the Chicago, Milwaukee & St. Paul R. R. tracks.

The Curtis Tire & Rubber Co., Muskegon, Mich., is having plans drawn for a larger plant than the one recently destroyed by fire. It will employ 500 men.

Harry Vissering, Harry Vissering & Co., railroad supplies, Lyton Building, Chicago, and W. H. Dangle, head of the Lovejoy Tool Works, Chicago, have purchased a controlling interest in the Crary Machine Works, Benton Harbor, Mich. The Crary plant will be enlarged at once.

R. D. Bourds and G. O. Bouchard, Grand Rapids, Mich., are organizing a company for the manufacture of a new type of piston rings for gasoline engines. They have secured a site in Hastings, Mich., and will erect a one-story foundry, 38 x 70 ft., with a cupola room, 20 x 20 ft.

The Henry N. Dudie La Pierre Co., 1314 West Twenty-first Street, Chicago, manufacturer of automobile steering wheels, will construct a foundry and two-story plant, 50 x 145 ft., to cost $50,000.

The Fort Dearborn Mfg. Co., Sterling, Ill., will erect a foundry, 100 x 120 ft.

The Groetkin Pump Co., Aurora, Ill., contemplates the erection of a two-story plant, 75 x 100 ft., costing $50,000.

The Borg & Beck Co., manufacturer of wood-working machinery, Moline, Ill., has increased its capital stock from $1,100,000 to $5,000,000.

The United Mfg. Co., Belmond, Iowa, has purchased the plant of the Novelty Iron Works Co., Dyersville, Iowa. It will manufacture boss power hammers, iron shears, shingle machines and concrete machinery. Recent additions to the plant include a machine shop and a grey iron and semi-steel foundry.

The Interstate Brass Mfg. Co., 11 South Dearborn Street, Chicago, has awarded contract to the Finlayson Construction Co., 139 North Clark Street, for a one and two-story plant, 75 x 125 ft., at 32 North Peoria Street, to cost about $48,000.

The University of Chicago is having plans prepared for the erection of a one-story and basement power plant, to cost in excess of $500,000, including equipment. Wallace Heckman, 134 South La Salle Street, is manager.

The Humboldt Iron Works, 139 North Clark Street, Chicago, has filed plans for a one-story brick addition at 439-41 North Western Avenue.

The Baker Tractor Corporation, 1319 Dime Bank Building, Detroit, is having plans prepared for a one- and two-story foundry at Galva, Ill. George A. Baker heads the company.

The Pennsylvania Tank Line Co., Sharon, Pa., has had plans prepared for a new one-story car and tank repair and construction shop at Argentine, Kan., 75 x 320 ft., and 75 x 218 ft.

The Barber-Greene Co., West Park Avenue, Aurora, Ill., manufacturer of wagon loaders and other material handling machinery, has construction under way on a one-story addition, 75 x 80 ft., to cost about $40,000.

The Russell Grader Mfg. Co., 2037 University Avenue, Minneapolis, Minn., manufacturer of machinery, has completed plans for its new one-story plant, to cost in excess of $350,000, including equipment.

The Fairmont Gas Engine & Motor Car Co., Fairmont, Minn., is considering the erection of a one-story foundry addition, 50 x 150 ft., to cost $100,000, including equipment.

The O. K. Giant Battery Co., Gary Ind., manufacturer of electric batteries, is taking bids for the first unit of its new plant at West Gary, comprising a one-story building, 50 x 400 ft., to cost about $60,000. It is also planning for a number of other structures of about the same size. Z. Arol Smith, 305 East Fifty-fifth Street, Chicago, is the architect.

The Leonard Tractor Co., 524 Broadway, Gary, Ind., will soon call for bids for its new one-story plant, 100 x 250 ft., at Griffith, to cost about $100,000, including equipment. H. M. Leonard is president.

Cleveland

CLEVELAND, May 17.

The falling off in business noted last week is more pronounced. While the railroad strike is believed to be largely responsible for present conditions there is considerable uncertainty about the future, due to the unsatisfactory labor situation and to the feeling that prices on many commodities are likely to show a downward tendency. The restriction of credits by banks is probably also a factor. There are some signs of curtailment which possibly may be due entirely to the strike situation, as many plants are unable to operate at capacity because of their inability to obtain raw material. Automobile manufacturers are suffering from lack of material and production in the tire industry in Akron has also slowed down. This has resulted in cancellations of castings for tire molds. Local employment departments report more applicants for work.

Some machine-tool builders are receiving a good volume of inquiries, but some prospective business has been held up. Shipment of a great deal of machinery is being held up in manufacturers' plants and on dealers' floors by the railroad strike. In the easing up in the demand for some machine tools builders are catching up slightly on deliveries.

The James Holan Mfg. Co., Cleveland, has purchased a 10-acre site on the Belt Line Railroad between State and Pearl roads, on which it will erect a $150,000 plant for the manufacture of automobile truck bodies.

The Cuyahoga Foundry Co., recently organized, is building a new gray iron foundry, 100 x 180 ft., for general jobbing work, on East Seventy-first Street. John Vild is president and Frank O. Patrny is secretary.

The Loew Mfg. Co., Cleveland, has planned the erection of an addition, but states that it has been decided to postpone the project until next fall.

The Laundryette Mfg. Co., East 152nd Street, Cleveland, will erect a three-story addition, 200 x 200 ft.

The General Fire Extinguisher Co., Warren, Ohio, is in the market for cranes and other equipment for its new gray iron foundry.

The Stark Foundry Co., Canton, Ohio, has been incorporated with a capital stock of $50,000 and will begin operations shortly in a foundry on Maple Avenue near the Wheeling & Lake Erie Railroad. E. E. Miller is president.

The Medina Mfg. Co., Medina, Ohio, has placed a contract for a reinforced concrete and steel addition, 70 x 240 ft., monitor type.

The Woodward Machine Co., Wooster, Ohio, will build an addition to be used as a forge shop and heat treating department.

The Bowling Green Die & Tool Co., Bowling Green, Ohio, has purchased the Monarch Building and will move to the new quarters shortly. This will permit the company to increase its output and to take care of additional business the capital stock has been increased from $25,000 to $100,000.

The Steven C. Jessup Pattern Works, Salem, Ohio, will move its plant to a new site and will add a new department for the manufacture of metal patterns.

The Akron-Newton Furnace & Mfg. Co., Newton Falls, Ohio, which was recently organized and acquired the plant of the Hall Mfg. Co., has elected James H. Heller, president; E. D. Reed, vice-president and treasurer; R. W. McCullum, secretary. The company will manufacture a safety signal automobile lamp, and engage in general machine shop work.

The Kenny Foundry Co., Mansfield, Ohio, is planning for the erection of a new one-story machine shop, foundry, pattern shop, and power plant. H. D. Kenny is manager.

The Virden Mfg. Co., Ashland Road, Cleveland, manufacturer of sheet metal stampings, etc., has completed plans for a two-story brick and steel addition at Ashland Road and Longfellow Avenue, 40 x 94 ft., to cost about $50,000.

The Seneca Wire & Mfg. Co., Fostoria, Ohio, has completed plans for the erection of a one-story steel and concrete addition, 167 x 208 ft., to cost about $100,000, including equipment. L. C. Kinn is general manager.

The Timken Roller Bearing Co., Canton, Ohio, will build a new machine shop, bids for which have not yet been closed. Considerable equipment will be needed.

Milwaukee

MILWAUKEE, May 17.

Probably the most unfavorable influence upon machine tool business is the transportation situation, which subjects deliveries, notably to the East, to harrassing delays. Production is going forward with facility, the fuel situation being less acute. Foundries, however, are operating virtually on a hand to mouth basis in respect to coke and fuel oil supplies.

The Globe Electric Co., 193-195 Broadway, Milwaukee, has purchased a site at Keefe and Humboldt avenues, and engaged Judell & Bogner, architects, 425 East Water Street, to design a new plant to cost about $150,000 and to be ready about Aug. 1. It manufactures self-contained electro-generator units, motor generator sets, storage batteries, etc. J. D. Wanvig is treasurer and general manager.

The Interstate Steel Mfg. Co., 705 South Pierce Street, Milwaukee, a reorganization of the Bayley Structural Iron Co., has let contracts for a new structural iron shop, 80 x 200 ft., at Forty-seventh and Rogers streets, in West Allis, on a 3-acre site. It is engaging in the production of fabricated steel frames for motor trucks, tractors, etc., beside continuing the fabricatoin and erection of building material. Harry F. Bayley is president; George Hoehn, vice-president, and W. R. Geiger, secretary and treasurer.

The Loeffler Machine Co., Sheboygan, Wis., manufacturer of chair hardware, wood-working factory machinery, etc., has awarded contracts for a foundry and machine shop addition, 40 x 180 ft., one story, of brick, concrete and metal sash, to cost about $50,000, including equipment now being purchased. William Loeffler, Sr., is president.

The Lake Motor Co., general offices, Merrill Building, Milwaukee, a $60,000 corporation organized several months ago, to manufacture small gas engines for motorcycles, tractors, farm lighting plants, etc., has arranged with existing shops for production pending the erection and equipment of its own plant later. Castings will be derived from the former foundry of the Universal Machinery Co. in West Allis, and the machine work and assembling will be done under contract by the Appleton Machine Co., Appleton, Wis., which is converting a two-story warehouse into a machine shop. An output of 50 motors a day is scheduled by Jan. 1, 1921. The officers are: President, Henry A. Schmitz, Sr., Appleton; vice-president, Charles Champion, Milwaukee; secretary, George J. Schmitz, Milwaukee; treasurer and chief engineer, Henry A. Schmitz, Jr., Appleton.

Joseph Popp and R. E. Goetzke of Shawano, Wis., are establishing a jobbing machine and repair shop and buying a small list of equipment. It is intended to erect a new shop later.

The Otto Biefeld Co., Watertown, Wis., will build two brick and steel shop additions, 47 x 73 ft., and 33 x 44 ft., equipped for structural fabrication, boiler shop, machine work, plumbing and steamfitting. The architect is Arthur Kuenzi, local.

The Ladewig Co., Waukesha, Wis., manufacturer of bottling machinery, is erecting a one-story brick machine shop addition, 40 x 60 ft. The Meredith Co., Milwaukee, is general contractor.

The Osborn Casting Co., Racine, Wis., has changed its corporate style to the Racine Foundry & Furnace Co., and increased the capital stock from $30,000 to $60,000.

The Fred Brune Co., 1194 Fourteenth Street, Milwaukee, manufacturer of special machinery and operating a jobbing machine shop, has incorporated its business with a capital stock of $60,000. The incorporators are Fred Brune, L. L. Brune and William H. Jenter. Enlargement of the shop is contemplated later in the year.

The Interstate Pattern Mfg. Co., Milwaukee, has been incorporated with a capital stock of $15,000 and will build a one-story shop, 40 x 75 ft., at Twenty-seventh Avenue and Burnham Street. The incorporators are James T. Gregerson, Edwin Christianson and Arthur G. Henzel, formerly part owner of the National Pattern Works, 345 Thirty-third Avenue.

The Badger Casket Co., 3005 Meinecke Avenue, Milwaukee, has decided to move its factory to Columbus, Wis., where an existing building will be converted and equipped. The company is being reorganized with the following officers: President, L. L. Tobin; vice-president, O. J. Albrecht; secretary and treasurer, W. J. Riedner.

The Chippewa Foundry & Machine Co., Chippewa Falls, Wis., has purchased a new Stannard Foster screw machine and is buying other new tools from time to time to piece out its equipment for larger capacity. Among its orders is one for an E-24 type pump, of 400 gal. capacity, for the new works of the Milwaukee Rolling Mill Co., Milwaukee.

The Union Electric Mfg. Co., 110 Reed Street, Milwaukee, manufacturer of electric controlling devices, has increased its capital stock from $50,000 to $80,000.

The Western Eagle Mfg. Co., Racine, Wis., has been incorporated with a capital stock of $50,000 to manufacture metal and wood patterns, tools, jigs, etc. The incorporators are Miller Peterson, Earl Albert and Jean Diehl, all of Racine.

The Scolding Locks Hairpin Co., Appleton, Wis., is installing additional tool equipment in its new plant on College Avenue, for the manufacture of patented machines for producing wire hairpins, with automatic sorting and packing auxiliaries. It will build 12 machines for its own purposes and later make equipment for other factories. Castings are being purchased from local foundries. H. P. Smith is works manager.

The Electrical Specialty Co., Milwaukee, has been granted a charter to manufacture and repair electrical appliances and goods. The capital stock is $5,000 and the incorporators are Oscar Schneider, F. J. Schroeder, A. Edmunds and Otto Kern, 812 State Street.

The United Fertilizer Co., Carrollville, Wis., has engaged Herman J. Esser, architect, 403 Camp Building, to design a one-story factory building, 100 x 100 ft., costing about $75,000 equipped.

The American Grinder Mfg. Co., Milwaukee, has effected a reorganization and admitted new capital to facilitate a material increase in its output, principally of steel socket wrenches for the automotive industries, marketed through C. N. & F. W. Jones, Chicago. Herman Brumder has been made treasurer of the reorganized company.

The Interstate Drop Forge Co., Milwaukee, expects to be in operation in June and make a specialty of small forgings and is putting in hammers from 800 to 1600 lb. The die shop will be equipped with the best types of modern die machinery. The company has succeeded in getting a stock of steel with which to start, and already has some orders for forgings.

Pittsburgh

PITTSBURGH, May 17.

The Dyke Motor Supply Co., Pittsburgh, is having plans prepared for a six-story plant, 50 x 110 ft., at Webster Avenue and Chatham Street, for the manufacture of automobile equipment, to cost about $125,000. P. C. Dowler, Magee Building, is the architect.

The Fulton Tool Works, Huntington, W. Va., is planning for two one-story additions to cost about $35,000.

The Meek & Bradley Mfg. Co., Huntington, W. Va., has been incorporated with a capital stock of $25,000 by H. Bradley, E. C. Meek and Edgar Mabley, to manufacture metal signs for automobiles, and other specialties.

The property of the Amos Coal Co., Fairmont, W. Va., has been acquired by new interests, headed by M. R. Beerbower. The new company is planning to electrify the works and considerable equipment will be installed.

The Mannington Boiler Works, Mannington, W. Va., is arranging for a new plant for the manufacture of its specialties.

The Blaw-Knox Co., Farmers' Bank Building, Pittsburgh, manufacturer of iron and steel products, steel forms, buckets,

etc., with a plant at Hoboken, Pa., has arranged for a preferred stock issue of $2,000,000. The company recently acquired the C. D. Pruden Co., Baltimore, manufacturer of sectional steel buildings.

Considerable machinery and equipment will be required for the one- and two-story addition, 100 x 368 ft., to be erected at the plant of the Hazel-Atlas Glass Co., Washington, Pa., estimated to cost about $500,000. Headquarters of the company are at Wheeling, W. Va.

The Board of Education, Fulton Building, Pittsburgh, is planning for the installation of a new machine shop and foundry at the Senior High School, Sixth and Division streets.

The Latrobe Electric Steel Co., Latrobe, Pa., has construction under way on a one-story addition, 40 x 100 ft., to cost about $25,000.

The Winner Gas Stove Co., Huntington, W. Va., has been incorporated with a capital of $50,000 by J. T. Masterson, H. C. Daniels and Dwight Sullivan, to manufacture gas stoves and equipment, electrical specialties, etc.

The Mississippi Wire Glass Co., Morgantown, W. Va., is planning for the installation of a new gas producer plant to cost about $100,000.

The Federal Iron Works Co. has opened a plant at 70-76 South Prospect Street, Youngstown, Ohio, and will manufacture ornamental iron, steel and wire products. J. M. McCarthy is president, A. Schmidt, vice-president and general manager; F. C. Dristman, secretary, and J. M. Flood, treasurer.

Detroit

DETROIT, May 17.

Through the purchase of the plant and equipment of the Detroit Wire Wheel Corporation, the Autoware Corporation, manufacturer of automobile parts and accessories, has increased its production and will make, in addition to its present product, a new wheel designed by C. S. Ash, one of the officials. In less than two years the Autoware Corporation has increased its floor space from less than 2000 sq. ft. to about 60,000 sq. ft. It has purchased about four acres of land on a railroad siding to care for future increases.

An addition has been started by the Production Foundries Co., Ann Arbor, Mich., which when completed, will increase its present production one-third.

Additions are being rushed to completion for the Triangle Motor Truck Co., St. Johns, Mich. New equipment will soon be ordered and it is hoped to increase production of trucks in a short time.

The General Machine & Tool Co., Jackson, Mich., incorporated in 1917, has outgrown its present quarters and has completed arrangements for a plant, 90 x 150 ft., daylight type, on property adjoining the Michigan Central Railroad. The company makes truck and tractor parts and employs about 800.

The F. A. Baird Machinery Co., Detroit, has had plans drawn for a new plant at Trenton, Mich., on the Detroit River.

Julius Stroh and associates of the Stroh Products Co., Detroit, are planning construction of an 18-story shop and office building on Adams Avenue, West.

The Michigan Screw Co., Lansing, Mich., has completed its three-story addition, 60 x 238 ft., and is reorganizing its production divisions. It will add 43 small automatic machines to the 43 now in operation, and also six large automatics. The grinding department will increase its capacity 50 per cent. New finishing machines will be installed.

The village of Durand, Mich., will receive bids on a 500-hp. engine for its municipal lighting and water plant. A new mechanical coal unloader, and pumps will also be purchased.

The J. L. Fussner Corporation, Monroe, Mich., has changed its name to the Monroe Pressed Steel Stamping Co. and increased its capital stock from $25,000 to $50,000. One of several large orders received recently was for 3,000,000 prices to be stamped for the Toledo Metal Products Co.

G. C. Nicholson and Karl Glema, Toledo, have organized the Monroe Pattern Co., Monroe, Mich. Machinery is being installed in a leased plant.

The Fisher Electrical Works, 32 Lynn Street, Detroit, is planning for the installation of a number of machine tools.

The Congress Tool & Die Co., 7 East Fort Street, Detroit, is taking bids for a one-story and basement machine and tool works, 55 x 116 ft., to cost about $20,000.

The Timken-Detroit Axle Co., 136 Clark Street, Detroit, manufacturer of automobile axles, is taking bids for a one-story heat treating building, 60 x 120 ft., on Waterloo Avenue. It is also planning for the construction of another building, one-story, 30 x 165 ft.

The E. F. Lyons Spring & Axle Co., Milwaukee Avenue, Detroit, has taken bids for a new two-story, brick and steel plant, 60 x 90 ft., to cost about $50,000. Stahl & Kinsey, 435 Woodward Avenue, are architects.

The Superior Machine & Engineering Co., 51-53 Fort Street, Detroit, is taking bids for a two-story works, 100 x 120 ft. Brown & Preston, Empire Building, are the architects.

Catalogs Wanted

The R. J. Teetor Co., Muskegon, Mich., manufacturer of Howe molding machines, desire catalogs and descriptive matter covering equipment and supplies for foundry and factory.

The Smalley General Co., machinery builder, Bay City, Mich., requests manufacturers to send catalogs of products or parts on which thread milling work is done. The company intends to assemble data on threading operations from every possible source in order to determine standard recommendations for various classes of threading operations. Catalogs should be addressed to F. H. Winters, in care of the company.

The Central South

ST. LOUIS, May 17.

The new plant of the Valley Electric Co., 794 Arcade Building, St. Louis, will consist of seven one-story buildings, 30 x 200 ft., and three two-story buildings, 40 x 400 ft., in addition to an existing structure on a site acquired. A complete machine department will be installed. The company has an operating capital of $525,000. S. A. Whiten is president, and Herbert Elder, treasurer.

The St. Louis Malleable Castings Co., 7701 North Conduit Street, St. Louis, has broken ground for two new one-story buildings at Forday Street and Thatcher Avenue, 100 x 465 ft., and 40 x 100 ft., to be equipped as a foundry and for general metal-working. C. G. Ette is general manager.

The Oklahoma Steel Casting Co., Tulsa, Okla., is arranging for a new plant to cost about $100,000, including equipment. It is proposed to develop a daily capacity of about 100 tons of steel castings.

The Tompkins Motor Co., El Reno, Okla., has plans for a two-story machine shop and automobile repair works, 50 x 108 ft. Charles H. Tompkins is general manager.

The Southern Textile & Machinery Co., 433 South Third Street, Paducah, Ky., has acquired a local site for its new works for the manufacture of knitting mill machinery. Plans for the initial unit consist of a foundry, drop forge works, die-casting shop, and other departments, also a power house. W. G. Paxton is manager.

The Forbes Corporation, Hopkinsville, Ky., has been incorporated with a capital stock of $400,000 by J. M., M. C., and W. H. Forbes, to manufacture agricultural implements, farm wagons, etc.

The Tri-State Tractor & Implement Co., Memphis, Tenn., has been incorporated with a capital stock of $10,000 by E. T. and L. N. Craig, and J. J. Megel, to manufacture agricultural implements.

The Hayden Mfg. Co., Springfield, Mo., capital $200,000, B. J. Hayden, O. E. Sayler and others interested, will equip a plant for the manufacture of stoves and other metal products.

The Wynne Blowpipe Co., Wynne, Ark., is in the market for $12,000 worth of equipment for the manufacture of blowpipes. J. B. Brown, J. F. Lay and others are interested.

The Deck Tank Co., Tulsa, Okla., J. F. & Geo. W. Deck and others interested, will equip a $175,000 plant for the manufacture of tanks.

The American Tractor & Harvester Co., Stuttgart, Ark., Starley White and others interested, will equip a plant to cost $100,000.

The Harlan Electric & Machine Works, Inc., Harlan, Ky., will make a specialty of small brass castings and do a general line of machine work and electrical repairs. It will not manufacture small machine tools, as erroneously stated.

B. F. Avery & Sons, implement manufacturers, have filed amended articles, increasing the capital stock to $6,000,000, an increase of $3,000,000 having been fully subscribed.

Cincinnati

CINCINNATI, May 17.

While there is a slight falling off in machine-tool inquiries, manufacturers report that conditions in the trade are satisfactory. The tie-up in transportation, added to a number of shops being handicapped in making deliveries by reason of the machinists' strike, tend to keep purchasers out of the market for a time. So far, however, no cancellations have been reported and many letters have been received from buyers stating that they realize the conditions with which the manufacturers are contending and are with them to the finish. No new lists have been received the past week and no action on those previously reported has been taken. The Chesapeake & Ohio Railroad, which recently inquired for a considerable number of tools, is expected to purchase within the next two weeks. Automobile manufacturers have been purchasers in the local market during the week and a few tools have been ordered for export to South America.

The Ahrens-Fox Fire Engine Co., Cincinnati, has increased its capitalization from $100,000 to $500,000. The company recently purchased property adjoining its plant at Alfred and Cook streets and while extensions are contemplated, nothing definite has been decided upon as yet.

The Air Friction Carburetor Co., Dayton, Ohio, has been authorized to increase its capitalization from $60,000 to $250,000. It is now located at First and Madison streets and has purchased property on which it is proposed to erect a five-story factory. J. W. Raymond is president.

The Premier Rubber & Insulating Co., Dayton, has increased its capitalization from $100,000 to $250,000. At a recent meeting of the stockholders William Grether was elected president and treasurer. The company occupies two buildings at Edmund Street and the Baltimore & Ohio Railroad and the increased capitalization is to care for expansion. Hard rubber and bakelite products are manufactured.

Construction on the new foundry of the Gartland-Haswell Co., Sidney, Ohio, is expected to be completed by July 1. The building will be 80 x 360 ft., with an addition for the cupola and coremaking room, 60 x 60 ft.

The Springfield Aluminum Pattern Co., Springfield, Ohio, has been incorporated by A. Diehl, J. Diehl, J. F. Brucker, J. F. Kennedy and W. C. Armstrong, with a capitalization of $10,000. It is understood that in addition to its pattern-making department it will operate a foundry for the production of brass and aluminum castings.

The capital stock of the Hayden-Corbett Chain Co., Columbus, Ohio, has been increased from $250,000 to $700,000. No definite plans have yet been made for extensions.

The Knox Tire & Rubber Co., 10-14 East Chestnut Street, Columbus, Ohio, is erecting a new factory at Mount Vernon, Ohio, which will have a daily capacity of 1000 tires and 2000 tubes. The plant is expected to be in operation by the middle of July.

The Gulf States

BIRMINGHAM, May 17.

The Woodward Iron Co., Mulga, Ala., is considering the installation of new electric equipment, including a 500-kw. rotary converter and auxiliary apparatus.

The new plant of the Go-Ro Mfg. Co., New Orleans, La., recently organized with a capital stock of $750,000 to manufacture gas-operated water heaters, will comprise a one-story, steel and concrete building, 110 x 328 ft., to be used as a machine shop, foundry and general metal-working operations. N. G. Goreau is president and Charles D. Schmidt, treasurer.

The Peddicord Motor Supply Co., Monroe, La., recently organized to manufacture automobile equipment, has awarded a contract to the Gehr Construction Co., Alexandria, La., for a three-story plant, 63 x 70 ft., to cost about $45,000. T. H. Peddicord is president and manager.

The General American Tank Car Corporation, Harris Trust Building, Chicago, expects to complete plans before the end of the summer for its new plant near New Orleans, on a 250 acre site. It will specialize in freight car and tank construction, with a department for repair work. The estimated cost is about $750,000.

The Texas & Pacific Railway Co., Dallas, Tex., is planning to build its machine and car shops at Big Springs, Tex., recently destroyed by fire. The work is estimated to cost in excess of $200,000, including equipment. E. F. Mitchell is chief engineer.

The Southwest & Southern Plating & Retinning Co., 415 Throckmorton Street, Fort Worth, Tex., recently incorporated, has been organized with Thomas B. Van Tuyl, president; Z. J. Eury, vice-president, and W. L. Osborn, treasurer and general manager. The company is planning to establish a local metal-working plant.

The American Well & Prospecting Co., Corsicana, Tex., has broken ground for a new one-story machine shop, to cost about $200,000, including equipment.

The Sunlite Co., McKinney, Tex., manufacturer of automobile lamps, etc., has awarded contract to J. E. Cooper, for a one-story plant, 90 x 135 ft., to cost about $100,000, including equipment. E. R. Brackett is engineer.

The Dallas Brass & Mfg. Co., Dallas, Tex., has been incorporated with a capital of $30,000 by J. Watt Davis, M. O. Booth and George Sutter, Jr., to manufacture brass, bronze and other metal specialties.

The Armot Automobile Agency, Houston, Tex., is planning for the erection of a three-story service and repair building, 100 x 150 ft., to cost about $150,000.

The General Motors Truck Co., Dallas, is planning for a new six-story works, 100 x 100 ft., to cost about $125,000. Ralph Briggs is manager.

The Great Southern Producing & Refining Co., Shreveport, La., W. J. Hungate, Hume-Mansur Building, Indianapolis, Ind., manager, will equip a 12,000 bbl. refinery, including laboratory, machine shop, boiler house, electric plant and other departments. It has a capital stock of $2,000,000.

The Central Lumber Co., Brookhaven, Miss., will equip at Quentin, Miss., an $80,000 double band and circular saw mill, for hardwood operation.

California

SAN FRANCISCO, May 10.

The Standard Oil Co., 200 Bush Street, San Francisco, has awarded a contract to the Foundation Co., Holbrook Building, for additions to its refinery at Richmond, to cost in excess of $5,000,000. Among the structures to be erected will be a mechanical and machine shop, to cost about $1,500,000, including equipment. A club building for employees is estimated to cost about $125,000.

The Allingham Flotation Machine Co., Los Angeles, has been incorporated with a capital stock of $500,000 by John Allingham, Edward and William Rosenberg, to manufacture mining machinery, parts, etc.

Sandberg & Essman, 501 Fourth Street, San Francisco, have filed plans for a one-story, brick automobile repair shop at 107 North Geary Street.

The Quality Foundry & Mfg. Co., Los Angeles, has been incorporated with a capital of $20,000 by Robert J. Schefferly, Thomas T. Robinson and John W. Hughes, to manufacture iron and other metal castings, etc.

The Economic Tool Co., 1032 South Grand Avenue, Los Angeles, has been organized to manufacture tools, machine parts, etc. E. O. Myers, 119 North Hope Street, heads the company.

The Frank O. Renstrom Co., 583 Golden Gate Avenue, San Francisco, has leased property adjoining his automobile establishment and will equip a new service and repair works in connection with other improvements. Facilities will be provided for parts manufacture, cylinder work, etc.

Paul F. Kingston, 519 California Street, San Francisco, has filed plans for a one-story machine shop at 137 North Ellis Street, to cost about $10,000.

The Western Brass Mfg. Co., Los Angeles, has been incorporated with a capital of $10,000 by Nathan Brostoff, David M. Clayman, and L. R. Raymond, 115 Sycamore Drive, to manufacture brass and bronze products.

The Bozzani & Davies Machine Shop Co., 411 Sunset Boulevard, Los Angeles, has been organized to manufacture automobile parts, machine parts, etc., and engage in repair work. David Davies, 2307 Huron Street, heads the company.

The Meek Oven Mfg. Co., 433 I. W. Heliman Building, Los Angeles, has filed notice of organization to manufacture oven and similar equipment. Richard P. and Edgar C. Feddersen, 175 South Hobart Boulevard, head the company.

The Bay Engineering Co., Market and Apgar streets, Oakland, Cal., has awarded a contract to C. Christensen & Son, 351 Twelfth Street, for a two-story, concrete mechanical shop, to cost about $13,000. R. N. Osborn heads the company.

The California Machinery & Supply Co., Los Angeles, has been incorporated with a capital stock of $50,000 by George E. Cloud, J. M. Whitney and Alfred Barstow, to manufacture machinery, etc.

Passenger cars and truck axles will be manufactured by G. J. Hoskins & Sons, who have removed to America from Sydney, Australia, where the G. & C. Hoskins Iron Works of Sydney and Lithgow, N. S. W., have been prominently

identified with the steel industry for many years. The passenger cars and truck axles will embody the front-drive invention of George J. Hoskins. The first American car using this invention is now nearing completion at Los Angeles, Cal.

The Pacific Northwest

SEATTLE, May 10.

The demand for practically all lines of machinery is fairly active with sawmill equipment in especially good call. Lumber manufacturers' operations are handicapped only by the continued car shortage.

The Specialty Foundry & Machine Works, Portland, has had plans prepared for an addition to cost $5000. New machinery will be purchased.

Starrett & Hovey, Eugene, Ore., have purchased the Saubert sawmill, which they will remodel and install new machinery at a cost of $40,000. It will have a daily capacity of 75,000 ft.

The Astoria-Marine Iron Works, Astoria, plans to undertake the manufacture of about $300,000 worth of parts for Ford machines, for the Ford Motor Co. New equipment will be installed in the plant. W. A. Viggers is president.

The plant of the Grays River Shingle Co., Grays River, Wash., was destroyed by fire recently with a loss of $20,000. It will be rebuilt.

The Albina Marine Iron Works, Portland, has been incorporated with a capital stock of $50,000 by William Cornfoot and others to manufacture and repair boilers, tanks and machinery.

The Menasha Woodenware Co. of Menasha, Wis., is arranging, through Herbert Armstrong, its North Bend, Ore., representative, for the establishment of a wood products plant in North Bend.

The Mars Truck Attachment Co., Yakima, Wash., has purchased a site on which it will erect a factory in the near future.

Canada

TORONTO, May 17.

The Dominion Department Public Works, Ottawa, Ont., will call for bids in the near future for the construction of a drydock at Esquimalt, B. C., to cost $1,500,000. R. C. Desrochers, Ottawa, is secretary.

Plans are being prepared for a factory for the Springer Lock Mfg. Co., 180 Coleman Street, Belleville, Ont. Beaumont Jarvis, 8 Campbell Street, is the architect.

The St. Maurice Paper Co., Cap De La Madeleine, Que., contemplates the expenditure of $500,000 on the construction of a grinding mill and the installation of machinery. A. MacLaurin is general manager and D. V. McSweeney, purchasing agent.

Beatty Bros., Ltd., Fergus, Ont., is in the market for a steam vacuum pump, steam boiler pump, one set of piping and valves, belt tightener, and boiler, 72 in. in diameter by 16 ft. long.

The Plant Carriage Works, Murray Street, Ottawa, Ont., will build an addition to cost about $60,000. Frank Plant is manager.

The Factory Products, Ltd., Parry Sound, Ont., will remodel a factory and install $15,000 worth of new machinery.

W. G. Durst, Chesley, Ont., is in the market for 2, 3, 5, 10 and 15-hp. electric motors, three-phase, alternating current, 220 volts.

The Collingwood Shipbuilding Co., Ltd., Collingwood, Ont., desires to get in immediate touch with manufacturers of machine molder gears.

Contracts have been let for the erection of nine factory buildings at Montreal, for the Canadian Pacific Railway, Windsor Station, to cost $1,250,000.

F. W. Wilson, care Lincoln Construction Co., Niagara Street, St. Catharines, Ont., has the general contract for a factory at St. Catharines, Ont., for the Ajax Wire Wheel Corporation of America, head office New York.

The Canadian Dyers' Association, Ltd., 2 Liberty Street, Toronto, will build an addition to its boiler house to cost $20,000.

Jones Motors, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by William G. Jones, 96 Indian Road; Wendell H. Osborne, 157 Bay Street; William Zimmerman and others to manufacture automobiles, motorcycles, trucks, engines, etc.

The Industrial Engineering Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $20,000 by Ronald G. Lee, 15 Harvard Avenue; Harry C. Bertram and others to manufacture electrical apparatus, tools, motors, etc.

The G. W. MacFarlane Engineering, Ltd., Paris, Ont., has been incrporated with a capital stock of $500,000 by George W. MacFarlane, Paris; Edward H. Ambrose, John R. Marshall, Hamilton, Ont., and others to manufacture machinery, castings, tools, etc.

Bastian-Morley, Ltd., Toronto, has been incorporated with a capital stock of $300,000 by James P. Morley, Oliver A. Ludlow, both of Laporte, Ind.; John M. Godfrey, Toronto, and others, to manufacture stoves, heaters, furnaces, lighting and heating systems, etc.

The Electro Medical Appliance Co., Ltd., Toronto, has been incorporated with a capital stock of $50,000 by George F. Davis, 24 Toronto Street; William J. Herdman, 216 Seaton Street; Arthur J. Layzell and others.

The Toronto Castings, Ltd., Toronto, has been incorporated with a capital stock of $500,000 by Frederick A. Dewey, 7 Aberdeen Avenue; Henri G. Smith, room 44, 2 Toronto Street; John F. Boland and others.

The Invincible Spark Plug Co., Ltd., Toronto, has been incorporated with a capital stock of $125,000 by John A. Campbell, 24 King Street West; Harold E. Manning, 152 Warren Road; Jacob H. Greenberg and others, to manufacture automobile accessories, tools, etc.

The National Show Case Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Harry Chinn, 16 Fairview Boulevard; Charles Wakely, and others to take over the business now carried on by the Toronto Wood Specialty Works, to manufacture show cases, wood and iron interior fittings, etc.

M. Cote, 7 Richardson Street, Montreal, will start work in the near future on the erection of a cast-iron foundry.

H. A. Wiles, 1350 Eighth Avenue West, Vancouver, B. C., is the architect and has the general contract for a machine shop, costing $8,000, for the Vivian Gas Engine Co., 1086 Sixth Avenue West.

The Gibson Mfg. Co., Guelph, Ont., manufacturer of gas engines, tractors, etc., is building a two-story addition, 80 x 140 ft., to its main building, to be used as a machine shop and assembling room. The company recently completed an extension to its molding shop.

The Canadian General Electric Co., 212 King Street West, Toronto, Ont., has let the general contract for addition to its plant and equipment at Peterboro, Ont., to John E. Hayes, 219 Park Street, to cost $500,000.

OFFICE CHANGES

The Titusville Forge Co., Titusville, Pa., has established a district office in the Commercial Trust Building, Philadelphia.

The New York office of Frank Samuel, iron and steel scrap, has been moved to Room 701, 39 Cortlandt Street.

The United States Copper Products Corporation, Cleveland, manufacturer of seamless brass and copper tubes, has opened a New York office at 1123 Broadway, in charge of Herbert Gnad.

The Leland-Gifford Co., Worcester, Mass., manufacturer of drilling and profiling machines, has moved its New York office to 2609 Singer Building. Walter F. Henly is manager of the New York office.

The T. P. Walls Tool & Supply Co., Inc., New York, has moved to its new quarters at 25 Leonard Street. This larger space will house their offices and warerooms.

The New York office of the Toledo Bridge & Crane Co., Toledo, Ohio, has removed from 52 Broadway to larger quarters at 29 Broadway. Arthur Appleton is the New York district manager.

William Vander Koogh & Co., Inc., iron and steel scrap, moved May 1 to room 22, 98 Park Place, New York. Telephones are Barclay 9437, 9438 and 9439.

The Page Steel & Wire Co., announces the removal of its offices on May 15 to the offices of the American Chain Co., with which it has been consolidated. Address Page Steel & Wire Co., suite 1054, Grand Central Terminal, New York.

The Reed-Prentice Co., the Whitcomb-Blaisdell Machine Tool Co. and the Becker Milling Machine Co. have opened their export office in the Grand Central Palace, New York, where a permanent exhibit of machines will be maintained as well as a complete stock of milling cutters.

NEW TRADE PUBLICATIONS

Machine Tools.—Allied Machinery Co. of America, 51 Chambers Street, New York. Six catalogs dealing with machine tools as follows: Radial drilling machines, plain and universal types, manufactured by Western Machine Tool Works, Holland, Michigan; drill grinding machines, universal grinding machines and surface grinding machines, Wilmarth & Morman Co., Grand Rapids, Mich.; plain and universal types of relieving machines, Cleveland Milling Machine Co., Cleveland; pipe expanding and flanging machines, Lovekin Pipe Expanding & Flanging Machine Co., Philadelphia; cold saw cutting-off machines, Espen-Lucas Machine Works, Philadelphia; heavy-duty draw-cut shaping machines, Morton Mfg. Co., Muskegon, Mich. The catalogs are illustrated.

Heat Treatment of Steel.—Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia. Catalog 90. Describes the "Hump" method for the heat treatment of steel. The work is heated in an electric furnace adjacent to a thermocouple and a recording instrument draws upon a scale the electromotive force developed by the thermocouple. While the work is passing through the transformation or decalescence point, the rise in temperature is arrested, producing a decided jog or "hump" in the line. The work is quenched a definite number of minutes after this hump appears. This method was described in detail in THE IRON AGE, issue of March 11, page 754.

Trolley Carrier.—American Steam Conveyor Corporation, 326 West Madison Street, Chicago. Catalog. Illustrates and describes a one-man method of handling coal, ashes and like material. The equipment consists of an overhead trolley, operated on either a monorail track or suspension cable. The hoist is used to lower and move a 1-ton, self-dumping bucket in which the material is carried.

Vises.—Prentiss Vise Co., 106 Lafayette Street, New York. Catalog, 48 pages, 6 x 9½ in. Illustrates and describes an extensive line of vises made with a self-adjusting jaw for iron workers, filers or finishers, woodworkers, machinists, etc.; also parallel, combination pipe, malleable pipe, bench, table clamp vises, etc.

Rubbing Machines.—Franklin Products, Inc., Syracuse, N. Y. Catalog. Describes the Brown rubbing machine designed for rubbing uneven or rounded as well as flat surfaces, and especially adapted for automobile body work. This machine was described in THE IRON AGE, issue April 29 page 1250.

Cutters.—Cleveland Milling Machine Co., Cleveland. Booklet. A stock list of standard cutters, including plain milling, side milling and angular cutters; spiral cut, slotting and spiral shell end mills; woodruff keyway cutters; metal slitting and castellating saws; convex, concave and double corner rounding cutters, etc.

American Ingot Iron Wire.—Page Steel & Wire Co., 30 Church Street, New York. Pamphlet. Describes the electrical and physical properties of American ingot iron wire. Gives data and results of tests made under the supervision of the Electrical Testing Laboratory, New York, and Frank F. Fowle, consulting electrical engineer.

Calendar.—Norton Co., Worcester, Mass. A 12-leaf calendar, 4⅝ x 7 in., each leaf bearing a three month's calendar with the figures for the current month in blue, past and succeeding months in red.

Stellite.—Haynes Stellite Co., Kokomo, Ind. Bulletin. Sets forth the origin of Stellite, its uses and advantages as a tool metal. Testimonials from users are included.

Slag Line Coolers.—Open Hearth Furnace Co., South Dearborn Street, Chicago. Bulletin. Describes the Naismith slag line cooler and sets forth economies resulting from its installation.

Air Flow Through Sand-Blast Nozzles.—Pangborn Corporation, Hagerstown, Md. Cardboard sheet, 9 x 11½ in. A table gives the air flow through sand blast nozzles with the horsepower required to compress.

Centrifugal Pumps.—De Laval Steam Turbine Co., Trenton, N. J. Catalog B, 44 pages, 8½ x 11 in. Deals with centrifugal pumps of the single-stage and multi-stage types for various services, and manufactured on an interchangeable basis, thus to permit of supplying of finished repair parts made to accurate dimensions. Formulæ and tables are given for calculating horsepowers, efficiencies, the readings of Venturi meters, friction in pipe lines, etc. The catalog is illustrated.

Electric Soldering Irons.—Cutler-Hammer Mfg. Co., Milwaukee. Booklet H. Describes and illustrates soldering irons and associated equipment, including an automatic rack, soldering fixture and current regulator for temperature control.

Gas Producing Machine.—Tirrill Gas Machine Lighting Co., 103 Park Avenue, N. Y. Pamphlet. Describes a gasoline gas producing machine which mixes the gas outside of the building for use in lighting, cooking, heating, and for laboratory and industrial uses.

Non-Ferrous Metals.—White & Bro., Inc., North American Building, Philadelphia. Catalog. Sets forth the purposes and advantages of "Certificate" metals. The company furnishes ingot copper, composition, bronze and brass ingots, babbitt metal, solder and type metals with a certificate which gives the physical and chemical properties. Photographs show steps in the testing of non-ferrous metals in the company's laboratory.

Milling Machines.—Ingersoll Milling Machine Co., Rockford, Ill. Bulletin 39, 21 pages, 8½ x 11 in. Deals with milling machines of the continuous type. The machines illustrated and described include those of the differential type, drum type, rotary and circular table machines, reciprocating type, and semi-automatic milling machines. Fixtures and cutters are also discussed.

Oxygen and Hydrogen Plants.—Electrolabs Co., Pittsburgh. Catalog. Deals with plants for the production, distribution, compression and utilization of oxygen and hydrogen gases. Levin oxy-hydrogen cells are described in detail and views are shown of installations in customers plants.

Grinding Wheel Stands.—Norton Co., Worcester, Mass. Booklet with the title "Grinding Wheel Stands in the Machine Shop." Deals with the selection of the stands, bearings, floor arrangement, speeds, work rests, protection hoods, etc.

Cooper Hewitt Illumination.—Cooper Hewitt Electric Co., 95 River Street, Hoboken, N. J. A portfolio of industrial illumination. Eighteen half-tones, 9 x 6¾ in., show machine tool works and ordnance plants illuminated with Cooper Hewitt lamps.

Conveyors.—Lamson Co., Boston. Bulletin No. 18 4. Illustrates and describes the functions of Lamson gravity conveyors, belt conveyors and automatic vertical elevators in a yeast wrapping plant.

Gasoline Operated Industrial Trucks.—Clark Tructractor Co., 1122 South Michigan Avenue, Chicago. Pamphlet. Illustrations and descriptions of a gasoline operated industrial truck manufactured with various types of bodies. These "tructractors" were described in THE IRON AGE, issue of July 31, 1919, page 303.

Design and Operation of Heating Furnaces.—Under-Feed Stoker Co. of America, Book Building, Detroit. Bulletin on the design and operation of heating furnaces by Nelson G. Phelps, M.E. Deals with the combustion of coal, theory of heat, furnace design, stoker application and waste heat boilers.

Friction Clutches as Applied to Machine Building.—Carlyle Johnson Machine Co., Manchester, Conn. Catalog, 50 pages, 8½ x 11 in. Presents applications of Johnson friction clutches to machine building. Photographs show applications of the clutch to lathes, vertical spindle milling machines, boring mills, rotary planer, polishing and buffing lathe, drill press, drilling machines, automatic vertical turrets, automatic screw machines, wire forming machines, woodworking machines, etc.

Grinding Wheels.—Norton Co., Worcester, Mass. Booklet with the title "How to Order Grinding Wheels." An outline of the essential specifications to be given when ordering grinding wheels.

Rigs for Electric Hoists.—Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. Booklet with the title "A Hoist Below the Hook." Photographs show various rigs devised for use with electric hoists. Applications include rigs for transferring heavy molds from the molding floor to the crucibles, transporting heavy cases, metal trays, platforms, automobile motors, barrels, heavy gears, etc.

Welding Torches, Regulators and Gages.—Air reduction Sales Co., 120 Broadway, N. Y. Five bulletins illustrating and describing the following: A and B oxy-acetylene welding torches. The A torch is designed for the average welding shop requirements. The B torch is a light torch for use in manufacturing work which requires operators to work continuously in one position and where a smaller flame is required than is provided by the A torch. Special A and B torches are made with different angles of heads. Also C welding torch, a small torch for use in welding and brazing aluminum ware, sheet lead, aeroplane parts, etc.; a new model A welding torch adapted to all classes of work ranging from sheet metal to heavy castings; carbon burning torch for removing carbon from the cylinders of internal combustion engines; regulators and gages for oxygen and acetylene in welding and cutting work.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manfacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	5.25c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 5.25c.
1 to 6 in. x ⅜ to 1 in.	3.52c. to 5.25c.
1 to 6 in. x ¼ to 5/16	3.62c. to 5.25c.
Rods—⅝ and 11/16	3.57c. to 5.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 6.50c.
Hoops	5.57c. to 6.50c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 5.25c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 5.25c.
3 in. x 3/16 in. and ⅛ in.	3.72c. to 5.60c.
1½ to 2½ in. x ⅛ in.	3.52c. to 5.90c.
1½ to 2½ in. x 3/16 in. and thicker	3.47c. to 5.85c.
1 to 1¼ in. x 3/16 in.	3.52c. to 5.90c.
1 to 1¼ x ⅛ in.	3.57c to 5.95c.
⅞ x ⅞ x ⅛ in.	3.62c. to 6.00c.
¾ x ⅛ in.	3.67c. to 6.05c.
⅝ x ⅛ in.	4.07c. to 6.85c.
½ x 3/32 in.	5.17c. to 7.55c.
Tees:	
1 x ⅜ in.	3.87c. to 6.25c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 6.15c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 5.95c.
3 in. and larger	3.52c. to 5.30c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	5.00c. to 5.25c.
Toe calk, ½ x ⅜ in. and larger	6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00 to 30.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 5.50c.

Sheets

Blue Annealed

	Per lb.
No. 10	6.62c. to 8.00c.
No. 12	6.67c. to 8.05c.
No. 14	6.72c. to 8.10c.
No. 16	7.82c. to 8.20c.

Box Annealed—Black

	Soft Steel C.R., One Pass per lb.	Wood's Refined, per lb.
Nos. 18 to 20	7.80c. to 9.90c.	
Nos. 22 and 24	7.85c. to 9.85c.	9.80c.
No. 26	7.90c. to 9.90c.	9.85c.
No. 28	8.00c. to 10.00c.	10.00c.
No. 30	8.10c. to 10.10c.	

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	8.25c. to 10.50c.
No. 16	8.50c. to 10.75c.
Nos. 18 and 20	8.65c. to 10.90c.
Nos. 22 and 24	8.80c. to 11.05c.
No. 26	8.95c. to 11.20c.
No. 27	9.10c. to 11.35c.
No. 28	9.25c. to 11.50c.
No. 30	9.75c. to 12.00c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt.	—36	—19	¾-1½ in. Butt.	—15	+ 5
¼-3 in. Butt.	—40	—24	2 in. Lap	— 7	+11
3½-6 in. Lap.	—35	—20	2½-6 in. Lap.	— 9	+ 7
7 12 in. Lap.	—25	— 8	7-12 in. Lap.	+ 2	+20

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per lb.
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.50c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

Base Price	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	11.80	11.55
		90 lb.	11.90	11.65
		100 lb.	12.00	11.75
IC...$16.50	$14.25	IC...	12.25	12.00
IX... 18.75	16.25	IX...	13.25	13.00
IXX... 20.50	18.00	IXX...	14.25	14.00
IXXX... 22.25	19.75	IXXX...	15.25	15.00
IXXXX... 23.75	21.50	IXXXX...	16.25	16.00

Terne Plates

8-lb. Coating 14x20

100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	61c.
Bar	70c. to 80c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks	14½c. open 15c.

Lead and Solder*

American pig lead	10c. to 11c.
Bar lead	11c. to 12c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c.
Commercial grade, per lb.	50c.

Antimony

Asiatic	11¼c. to 11¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c.

Old Metals

Inquiry is light and the market very sluggish. Dealers' buying prices are as follows:

	Cents per lb.
Copper, heavy and crucible	16.50
Copper, heavy and wire	15.75
Copper, light and bottoms	14.00
Brass, heavy	10.50
Brass, light	7.75
Heavy machine composition	16.00
No. 1 yellow brass turnings	10.00
No. 1 red brass or composition turnings	12.50
Lead, heavy	7.00
Lead, tea	5.00
Zinc	5.25